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BARBADOS

ANNUAL REPORT

OF THE

Department of Science
and Agriculture

FOR THE YEAR

1949—1950





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DEPARTMENT OF SCIENCE AND AGRICULTURE

STAFF

Director of Agriculture	..	..	..	C. C. SKEETE, O.B.E., B.A.
Deputy Director of Agriculture	..	..	..	VACANT.
Entomologist	..	..	..	R. W. E. TUCKER, M.A., (Cantab), B.Ed. (Capetown).
Veterinary Officer	..	..	..	M. B. PROVERBS, M.R.C.V.S.
Chemist	..	..	..	J. B. D. ROBINSON, B.Sc., Agric. (Hons.).
Botanist	..	..	..	VACANT
Government Analyst	..	..	..	C. A. COPPIN, B.A.Sc. (Toronto) A.R.I.C.
Senior Lecturer in Natural Sciences	..	..	..	VACANT
Lecturer in Natural Sciences	..	..	..	VACANT
do.	do.	do.	..	F. N. A. FIELDS, B.Sc.
do.	do.	do.	..	R. D. PIGGOTT, (Ag.).
Plant Diseases Inspector	..	..	..	D. R. D. WILES, D.I.C.T.A.
Principal Clerk	..	..	..	H. O. RAMSEY.
Senior Clerk	..	..	..	G. D. RAMSEY.
Clerk	..	..	..	A. S. INNISS.
Clerk	..	..	..	C. B. LONG.
Clerk	..	..	..	E. F. OXLEY.
Stenographer-Typist	..	..	..	MISS N. E. CALLENDER.
Stenographer-Typist	..	..	..	MISS E. V. BECKLES.
First Agricultural Assistant	..	..	..	C. B. FOSTER.
Agricultural Assistant	..	..	..	H. E. WARD.
do	do	..	..	L. H. ATKINSON.
do	do	..	..	W. M. FOSTER.
do	do	..	..	J. E. CLARKE.

Senior Peasant Agricultural Instructor	..	C. A. E. BECKLES, D.I.C.T.A. (Ag.)			
Peasant Agricultural Instructor	..	G. B. PILGRIM.			
do.	do.	do.	..	..	L. T. TALMA.
do.	do.	do.	..	..	C. B. CUMMINS.
do.	do.	do.	..	..	G. A. RAMSAY.
do.	do.	do.	..	..	C. D. SPOONER.
do.	do.	do.	..	..	E. S. BRATHWAITE.
do.	do.	do.	..	..	F. M. CUMMINS.
do.	do.	do.	..	..	V. F. GAY.
do.	do.	do.	..	..	A. YARD.
do.	do.	do.	..	..	E. G. ST. JOHN.
do.	do.	do.	..	..	H. D. C. SEALY.
do.	do.	do.	..	..	C. V. DRAYTON.
do.	do.	do.	..	..	C. A. RILEY.
do.	do.	do.	..	..	A. J. BELLAMY.
do.	do.	do.	..	..	J. E. WASON.
do.	do.	do.	..	..	D. A. CORBIN.
do.	do.	do.	..	..	E. L. MURRAY.
Senior Analytical Assistant	..	..	..	H. A. JONES.	
Analytical Assistant	..	..	..	L. A. HALL.	
do.	do.	..	..	E. W. MAXWELL.	
do.	do.	..	..	K. H. STREAT.	
do.	do.	..	..	D. A. WICKHAM (Ag.).	
Entomological Assistant	..	..	..	W. HEADLEY.	
Field Assistant	..	..	..	V. E. JAMES.	
Government Laboratory Attendant	..	..	..	H. A. WHARTON.	
Entomological Laboratory Attendant	..	..	..	A. GITTENS.	

Foreman-in-Charge of Nurseries and Meteorological Station	..	..	T. O. HOYTE.
Assistant Gardener	..	..	F. A. JORDAN.
Agricultural Department Messenger	..	..	G. BARKER.
Government Laboratory Messenger	..	..	L. H. MOORE.

NON-ESTABLISHED OFFICES

Co-operative Officer	..	..	J. M. CAVE, D.I.C.T.A.
Fishery Officer	..	..	D. W. WILES.
Fishery Assistant	..	..	O. E. MOSELEY.

COLONIAL DEVELOPMENT AND WELFARE SCHEMES

Scheme D.217 — Agricultural Development.

Livestock Officer	..	..	A. D. HERBERT, D.I.C.T.A., (Seconded).
Manager, Central Livestock Station,	..	..	H. E. KIRTON.
Overseer, do. do. do.	..	..	J. K. DRAYTON.
Secretary, Barbados Dairy and Stock Breeders' Association	..	..	A. G. F. SEALE.
Clerk, C. D. & W. Schemes	..	..	E. A. B. DEANE.
Clerical Assistant	..	..	H. W. FORDE.
do. do.	..	..	VACANT.
do. do.	..	..	F. B. TAYLOR.

Scheme D.235 — Experimental Cotton Spinning Plant

Manager	..	..	N. A. PHILLIPS.
Overseer	..	..	A. HAYNES.

Dr. (now Sir John) Saint, C.M.G., O.B.E., retired from the post of Director of Agriculture on September 30th, 1949, and Mr. C. C. Skeete, O.B.E., B.A., who was Assistant Director of Agriculture in this Department from 1923 to 1934, was appointed in his place. Mr. Skeete assumed duty on the 22nd of October.

Mr. Skeete was absent from the island from February 24 to March 1, 1950, attending a Conference of Education and Agricultural Officers held at the Imperial College of Tropical Agriculture, Trinidad, to discuss the establishment of a Farm Institute for the Eastern Caribbean.

Mr. M. Halerow, O.B.E., B.Sc., Deputy Director of Agriculture, was transferred on promotion and left the Colony on the 6th of December, 1949.

Mr. R. W. E. Tucker, Entomologist, was granted six months' vacation leave from the 30th of April, 1949, which he spent in the United Kingdom. While there, he visited various institutions to study recent entomological research. He resumed duty on the 10th of November, 1949.

Mr. A. G. Mill, Livestock Officer, accepted an appointment as Agricultural Attache to the British Embassy at Buenos Aires, and proceeded to England, in the first place, in September 1949.

Dr. L. R. Hutson, B.V.Sc., D.V.Sc., was re-appointed to the Leeward Islands as Principal Veterinary Officer, on the 19th of January, 1950, and Dr. M. B. Proverbs, M.R.C.V.S., was appointed in his place. Dr. Proverbs assumed duty on the 4th of February.

Mr. D. M. Hanschell, B.Sc., A.I.C.T.A., Botanist, was transferred, on promotion, in January, 1950, to the post of Sugar Agronomist in the Department of Agriculture, Trinidad.

Mr. F. A. Sweet, B.Sc., A.R.I.C., Senior Lecturer in Natural Sciences, resigned his post on the 5th of January, 1950, to become a science master at Queen's Royal College, Trinidad.

Mr. V. A. A. Archer, B.S.A., (McGill), M.S.A. (Toronto), F.C.I.C., Lecturer in Natural Sciences, was granted six months' vacation leave from the 1st of September, 1949, prior to the assumption of his new duties as Headmaster of the Dominica Grammar School.

The following officers proceeded to Antigua on duty leave from the 26th of September to the 9th October, 1949, to attend meetings of the Advisory Committees of the Central Sugar Cane Breeding Station and of the B.W.I. Sugar Technologists' Association :— Sir John Saint, Messrs. G. C. Stevenson, Cytogeneticist, B. deL. Iuniss, Botanist, Cane Breeding Station, and J. B. D. Robinson, Chemist.

Dr. M. B. Proverbs, Veterinary Officer, and Mr. J. B. D. Robinson, Chemist, attended a Caribbean Commission Conference on livestock problems, which was held in Trinidad from the 28th of February to the 3rd of March, 1950. Mr. Robinson also attended a Conference of soil scientists at Puerto Rico, under the auspices of the Caribbean Commission, from the 30th of March to the 8th of April, 1950.

Mr. C. St. A. Alleyne, Analytical Assistant, died on the 21st of July, 1949, after a very short illness. He had completed 29 years of service in the Department, and his untimely death is regretted.

Mr. R. E. Barrow, Sugar Analyst, was seconded to the Sugar Technology Laboratory at Edgehill as from the 1st of January, 1950.

Mr. K. H. Streat was confirmed in his appointment as Analytical Assistant with effect from the 1st of April, 1949.

Mr. D. A. Wickham was appointed on probation, as Analytical Assistant, from the 1st of October, 1949.

Consequent on the resignation of Mr. F. E. Bynoe, Mr. E. L. Murray was appointed, on probation, as a Peasant Agricultural Instructor from the 1st of April, 1949.

BRITISH WEST INDIES CENTRAL SUGAR CANE BREEDING STATION

ADVISORY COMMITTEE

- Chairman — C. C. Skeete, O.B.E., B.A., Director of Agriculture, Barbados.
- Members — H. J. Page, O.B.E., B.Sc., F.R.I.C., F.I.R.I., Principal of the Imperial College of Tropical Agriculture, Trinidad.
- E. W. Leach, B.Sc., A.I.C.T.A., Director of Agriculture, Trinidad.
- A. C. Barnes, C.M.G., Director of Research, Sugar Manufacturers' Association (of Jamaica) Ltd., (nominee of the Director of Agriculture, Jamaica).
- H. H. Croucher, B.Sc., A.I.C.T.A., Director of Agriculture, British Guiana.
- R. B. Allnutt, B.Sc., Director of Agriculture, Leeward Islands.
- Sir John Saint, Kt., C.M.G., O.B.E., Director, Sugar Technology Laboratory, Barbados.

STAFF

- Cytogeneticist — G. C. Stevenson, B.A., (Hons.) Cantab., A.I.C.T.A.
- Botanist — B. deL. Inniss, B.Sc., A.I.C.T.A.
- Agricultural Assistant — N. L. Foster
- „ — C. D. Gilkes
- Statistical Clerk — E. L. Jones
- Stenographer - Typist — Miss S. O. Maxwell

BOARD OF AGRICULTURE

The members of the Board of Agriculture appointed for the Legislative Session 1949—50 were as follows:—

The Hon. G. D. L. Pile, O.B.E., M.L.C., Chairman.

„ „ J. D. Chandler, M.L.C.

H. A. Dowding, Esq., M.C.P.

E. L. Ward, Esq., M.C.P.

A. E. S. Lewis, Esq., M.C.P.

L. E. Smith, Esq., M.C.P.

F. E. C. Bethell, Esq., M.C.P.

H. A. Watson, Esq.

The Director of Agriculture is an *ex-officio* member of the Board.

REPORT ON THE WORK OF THE DEPARTMENT OF SCIENCE AND AGRICULTURE FOR THE YEAR ENDING 31ST MARCH, 1950.

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PART I.

SUMMARY OF AGRICULTURAL POLICY

1. The conservation of soil and the maintenance and improvement of soil fertility.
2. The control of pests and diseases of crops.
3. The Improvement of crop yields by selection and breeding.
4. The maintenance of a sound animal husbandry industry as an integral part of the farming system.
5. The development and improvement of the Fishing Industry.
6. The encouragement of the production of local food crops, especially green vegetables.
7. The stimulation of co-operative ventures, particularly amongst small holders.
8. The development of irrigation in suitable areas.

PART II.

GENERAL

1. WEATHER CONDITIONS DURING THE YEAR

Detailed climatic data, as recorded at the Meteorological Station at Codrington, St. Michael, are given in Appendix I to this Report. Water is the principal factor limiting growth in Barbados and, as the water supply is almost entirely dependent on rainfall, the monthly average rainfall for the Colony is an important factor to record. The average rainfall for the period November 1948 — January 1950, which covers the growing period of the plant cane, compared with the average rainfall for the two fifty-year periods 1848—1897 and 1898—1947 are set out in Table I.

TABLE I.

MONTH	Rainfall in Inches		
	Average		Average
	1848-1897	1898-1947	1948-1950
November	7.93	7.52	10.53
December	4.94	4.64	4.42
January	3.72	3.05	1.25
February	2.30	1.93	1.04
March	1.91	1.96	1.37
April	2.48	2.15	1.43
May	3.77	2.62	1.96
June	5.63	5.09	6.13
July	6.06	6.48	2.95
August	7.68	6.78	13.45
September	7.66	7.51	11.13
October	8.30	7.20	13.31
November	7.93	7.52	3.36
December	4.94	4.64	3.51
January	3.72	3.05	5.94
Total	78.97	72.14	81.78

The average monthly rainfall figures for the Island for the fifteen months period November 1948 to January 1950, when compared with the average figures for the previous two fifty-year averages, show that the rainfall was above average in total quantity but that the distribution was unsatisfactory.

II. AGRICULTURAL CROPS

A. SUGAR CANE.

(a) Production

The yield of sugar cane reaped during 1949 was the equivalent of 152,731 tons sugar. This was made up of 133,868 tons Vacuum pan sugars, 1,991 tons

Muscovado sugar, 5,567,700 wine gallons Fancy Molasses, which, equated on the basis of 330 wine gallons of Fancy Molasses to the ton of sugar, is the equivalent of 16,872 tons sugar.

The sugar production in Barbados for the past six years is set out in Table II.

TABLE II.

Sugar Production for the Period 1944—1949.

	1944	1945	1946	1947	1948	1949
Vacuum Pan sugar ..	82,819	98,120	111,933	86,369	56,496	133,868
Muscovado sugar ..	1,508	1,113	1,377	1,655	1,262	1,991
Fancy Molasses	20,175	20,215	20,410	23,208	20,468	16,872
	104,502	119,448	133,720	111,232	78,226	152,731

(b) Export of Sugar and Local Consumption

The colony's entire exportable surplus of sugar was purchased by the Ministry of Food. The export of sugar is still regulated by the Sugar Production and Export Control Board of which the Director of Agriculture is Chairman. Care is exercised to ensure that the requirements of the local market are provided for.

The position with regard to local consumption and export during the period September 1948 to August 1949 is as follows:—

Estimated stocks in hand at 1st September, 1948:—

	tons	tons
Fancy molasses for export	6,875	
Sugar for export	2,823	
Sugar in wholesalers' hands	7,103	16,801
Production during 1949		152,731
		169,532

Estimated stocks in hand at 1st September, 1949:—

Fancy molasses for export	11,413	
Sugar for export	21,096	
Sugar in wholesalers' hands	5,492	38,001
		131,511

Total exports, as per Customs returns, for the period:—

Fancy molasses	11,362	
Sugar	107,337	118,699

Difference representing Sugar left in the hands of merchants for local consumption	12,832
--	--------

By the end of December 1949 most of this sugar had been exported.

(c) Fancy Molasses

The Barbados Fancy Molasses Industry continues to be under the control of the Fancy Molasses Control and Marketing Board of which the Director of Agriculture is Chairman.

Little of the 1948 crop of Fancy Molasses remained to be shipped at the end of December, 1948. The Fancy Molasses Control and Marketing Board allocated some 50,600 puncheons for production during 1949 for export. Of this quantity, some 36,500 puncheons were manufactured by small fancy molasses plants and the remainder by vacuum pan factories.

The quantity of fancy molasses which the importing markets required out of the 1950 crop production was 45,600 puncheons. This figure is well below that of recent years.

(d) The Special Funds for the Benefit of the Sugar Industry and the Welfare of the workers

As was done since the 1947 crop sugars purchased by the Ministry of Food, a sum of £2 15s. per ton was included in the price for 1949 crop sugars to be paid into the following funds at the rates shown:—

Sugar Industry Rehabilitation Reserve Fund ..	20/- per ton
Sugar Industry Price Stabilization Reserve Fund ..	25/- " "
Labour Welfare Fund	10/- " "

The Sugar Industry Rehabilitation Reserve Fund continues to be administered by the Sugar Industry Capital Rehabilitation Reserve Board, of which the Director of Agriculture is Chairman. The major portion of the funds collected has been paid out in accordance with Regulations made under the principal Act.

The Sugar Industry Price Stabilization Reserve Fund is administered by the Sugar Industry Price Stabilization Reserve Board, of which the Director of Agriculture is Chairman. The amounts accruing to this fund have been deposited with one of the local banks and is earning interest. The purpose of this fund is to mitigate the adverse effect of a reduction in the price of sugar.

The Labour Welfare Fund is administered by the Governor-in-Executive Committee.

(e) Acreage under Cane

Under the Sugar Cane Census, Act, 1937-31, it is compulsory for all land-holders with more than ten acres of land to make a return to the Department of Agriculture showing the acres of cane, and the various varieties to be reaped during the ensuing crop season.

The results of the census for the 1950 crop is presented in Table III. together with the corresponding figures for the years 1941 to 1949 inclusive.

As a result of the recent surveys the acreage of cane grown by small-holders is estimated at 7,000 acres.

TABLE III

Acreage of Sugar Cane reaped in the years 1941—50.

	ACREAGES								
Year	Plantations							Small Holders (estimated)	Total
	Plant Canes	First Ratoons	Second Ratoons	Third Ratoons	Fourth Ratoons	Fifth Ratoons	Sixth and Seventh Ratoons		
1941	14,059.36	11,846.46	6,580.47	1,942.74	237.05	5.00	—	7,000	41,671.08
1942	15,023.77	9,928.64	5,651.64	2,278.44	348.13	11.75	—	7,000	40,242.37
1943	15,374.95	10,004.44	3,629.84	1,235.49	293.74	6.86	—	7,000	37,545.32
1944	14,144.22	10,557.28	4,203.08	814.51	72.82	4.50	—	7,000	36,796.41
1945	14,551.53	9,744.58	4,756.20	865.70	52.02	1.34	—	7,000	36,971.37
1946	14,056.25	11,614.50	5,578.25	1,817.50	51.25	6.00	—	7,000	40,123.75
1947	13,365.25	11,569.00	6,501.00	1,771.50	257.25	2.25	—	7,000	40,466.25
1948	13,480.75	10,614.00	6,281.00	2,126.75	255.50	28.00	—	7,000	39,786.00
1949	13,869.56	10,911.46	5,249.99	2,090.72	370.49	33.00	—	7,000	39,701.22
1950	13,435.78	11,785.71	6,350.76	2,147.50	415.25	53.00	17.25	7,000	41,245.25

(f) Variety Acreages

These were obtained from plantation returns of the variety acreages to be reaped each year. The variety percentages for all crops for the year 1941 to 1950 are presented in Table IV.

TABLE IV

Percentages of Acreages of Sugar Cane varieties recommended by the Department and other varieties reaped during the period 1941—50.

PERCENTAGES OF TOTALS

Varieties	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
B.2935	45.66	42.45	20.95	4.73	1.94	0.68	0.26	0.23	0.09	0.04
B.H.10(12)	22.16	19.81	12.69	8.00	4.76	3.19	2.49	1.36	0.33	0.09
B.726	17.33	15.64	9.58	4.79	2.95	2.02	1.26	0.70	0.15	0.03
Mixed & other varieties	14.85	14.65	11.14	8.50	4.83	2.55	1.25	0.52	0.39	0.47
B.3439	—	3.60	8.35	9.49	4.89	2.40	0.54	0.25	0.12	0.06
B.37161	—	1.48	26.77	48.69	62.65	74.52	83.83	90.00	92.76	90.80
B.35187	—	2.37	10.19	11.28	10.19	6.09	3.25	1.91	0.98	0.53
B.34104	—	—	—	4.19	7.46	6.89	3.83	1.24	0.32	0.12
B.4098	—	—	0.33	0.33	0.33	1.56	3.00	3.43	4.14	4.93
B.41227	—	—	—	—	—	0.06	0.08	0.06	0.14	0.49
B.41211	—	—	—	—	—	0.04	0.21	0.30	0.58	2.44

It will be seen from the above Table that of the total acreage reaped by plantations in 1950, B.37161 occupied 90.80 per cent., a decrease of 1.96 per cent. as compared with 1949. The acreage of B.41211 increased by 1.86 per cent., that of B.4098 and B.41227 by 0.79 per cent, and 0.35 per cent respectively.

B. COTTON

The close season for cotton was again maintained at three months duration. The area planted to cotton was 386 acres.

No pink boll worm was observed in the field or ginnery although careful inspections were made.

C. FOOD CROPS

As in the war years, the acreage of food crops grown during the year was regulated by Notice served under the Local Food Production (Defence) Control Order. Owners of land were required to plant a minimum of twenty-one per cent. of their arable acreage in food crops, of which at least six per cent., was required to be 'thrown-out' land. The areas of the crops to be grown were as follows:—

'Preparation land' (15% of arable land)

Yams	..	..	46%
Sweet Potatoes	..	..	27%
Corn, eddoes, pulses etc.	..	..	27%

'Thrown-out land' (minimum of 6% of arable land)—

Sweet Potatoes	..	..	100%
----------------	----	----	------

Weather conditions were excellent for all kinds of food crops and, in order to permit the harvesting of 'preparation' land potatoes, the Government dehydrating factory was operated over a period of some six weeks, and a total of 6,016 bags of 100 lb. of cassava and sweet potato meal were manufactured. This meal is being incorporated in the Balanced Animal Feed.

D. MINOR CROPS

The propagation and distribution of various types of citrus, avocado pear, dwarf coconuts, breadfruit, Barbados cherry, guava and other fruit trees was continued during the year.

E. IRRIGATION

The Scheme for providing irrigation equipment to peasants, which is assisted by free grants from Development and Welfare funds, has been proceeded with as rapidly as possible. Considerable difficulty is still being experienced in obtaining equipment to implement this scheme owing to currency and supply shortages.

PART III

SECTION I.

PEASANT AGRICULTURE

BY

C. A. E. BECKLES,

Senior Peasant Agricultural Instructor.

A. General Conditions During the Year

The Weather. The very dry conditions experienced during the first half of the year, as indicated in the rainfall figures given in the previous section, delayed the planting of the main food crops. Exceptionally heavy showers, beginning with the rainstorm on the night of August 31st—September 1st, followed by intermittent showers during September and October, made the growing of garden vegetables at this period very difficult. During the “catch” cropping season, November, 1949 to March, 1950, almost ideal weather conditions prevailed, so that by February, 1950, the market was glutted with minor crops such as cabbage, carrot, beet and tomatoes.

The Main Food Crops. Most of the main food crops in season were in good supply throughout the year. These included yams, corn, cassava and eddoes. The June planting of sweet potatoes in some areas was somewhat limited owing to difficulty in obtaining slips for planting. Very good crops of Guinea corn were harvested at Christmas time.

Sugar Cane. As might be expected, the severe dry season retarded the growth of the sugar cane. Both plant and ratoon canes, however, responded well to the rains which fell late in the season, with the result that an excellent crop was reaped. The position is illustrated in the following comparative yield data:—

Sugar Cane Delivered to all Factories in 1950.

<i>Estates</i>	<i>Peasants</i>	<i>Total</i>	<i>Peasants' Canes as Per cent. of</i>
<i>(tons)</i>	<i>(tons)</i>	<i>(tons)</i>	<i>Total</i>
1,118,003	198,903	1,316,906	15.04

Average No. of Tons of Cane per Acre reaped in 1950.

	<i>Area</i>	<i>Yield</i>	<i>Average Yield per acre</i>
	<i>(acres)</i>	<i>(tons)</i>	<i>(tons)</i>
Estates	34,241	1,118,003	32.65
Peasants	7,000*	198,903	28.41

* estimated

TABLE I

Summary of Sugar Cane Yield Data 1941—50

Sugar Cane Delivered to all Factories

Year	Total Crop (tons)				Average No. of tons per acre reaped	
	Estates	Peasants	Total	Peasants as per cent. of total	Estates	Peasants
1941 ...	807,489	101,977	909,466	11.21	23.29	14.57
1944 ...	766,661	117,956	884,617	13.33	25.73	16.85
1946 ...	946,345	158,537	1,104,882	14.35	28.57	22.65
1947 ...	866,662	122,443	989,105	12.38	25.89	17.49
1948 ...	641,044	77,211	718,255	10.75	19.50	11.03
1949 ...	1,122,072	184,524	1,306,596	14.12	34.31	26.36
1950 ...	1,118,003	198,903	1,316,906	15.04	32.65	28.41

The records for 1942, 1943 and 1945 were incomplete. Estates refer to holdings over ten acres in extent, peasants refer to holdings under ten acres, and again the area under peasants' canes has been estimated at 7,000 acres.

Minor Crops. (a) *Groundnuts.* Once again the area devoted to groundnuts was limited owing to the shortage of seed for planting. Small quantities of the variety "Virginia Bunch" were distributed to growers through the district Agricultural Stations, and good yields were reported in the lower rainfall districts. At The Home Agricultural Station, St. Philip, a plot of one-third of an acre of this variety yielded at the rate of over 3,000 lb. per acre of nuts in shell.

(b) *Cotton.* Details with respect to yields of cotton are given in another section of this report. It may be pointed out here, however, that the area planted to cotton was considerably less than in the previous year. Yields were for the most part below expectations, although extension of the growing season to the end of April enabled growers to reap their full crop. These unusually low yields, especially in the leeward districts, were attributed to the adverse effect on the crop of the heavy rainfall in September and October.

(c) *Tomatoes.* Ideal weather conditions during November and December resulted in excellent crops of tomatoes being harvested during the first three months of 1950. Indeed, by February the local market for tomatoes was glutted and prices fell from 24-36c. per lb. in December and January to 8-10c. per lb. in late February and early March. The main varieties grown were "Bounty" and "Early Prolific."

(d) *Cabbages.* Inter-cropping of the young plant canes with cabbage and other crops is being practised on an increasingly large scale. This, plus the fact that the weather was favourable during the "catch" crop season, accounted for good supplies on the market from January onwards. Heavy rains during the main growing season, however, resulted in severe erosion in some areas with loss of seed and destruction of young plants. Many cultivators were compelled to replant their areas more than once, so that the main crop was very late.

cabbages being unobtainable in November and very scarce and expensive in December.

(e) *Okras*. Large-scale growing of okras occurs mainly in Christ Church and St. Philip. As in the case of last year, very good crops were harvested and low prices prevailed. The difficulty experienced by growers in disposing of their crops was blamed on the shortage of corn meal with which okras are principally used in preparing a favourite local dish.

(f) *Irrigated Vegetable Crops*. Owing to the steady increase in the number of irrigated gardens, vegetables were in good supply even during the prolonged dry season. In point of fact, except during the period following the heavy rains of September and October when many gardens in the Goodland area of St. Michael—the chief concentration of irrigated vegetable gardens—were “washed out”, good supplies of these crops were always available. Growers experienced little difficulty in disposing of their crops, save for the period February and March, 1950, when the market for most of these crops appeared to be saturated. The prices in St. Michael at the end of March, 1950 are shown in the following table:—

TABLE III

Crop	Prices to Growers	Retail Prices
*Sweet potatoes	\$1.50 per 100 lb.	3c. per lb.
*Yams		
*Eddoes		
Beans, Stringless	16c. per lb.	24c. " "
Beet	8-10c. " "	12-14c. " "
Cabbage	16-18c. " "	20c. " "
Carrot	8-10c. per lb.	12-14c. per lb.
Cauliflower	20c. " "	24-30c. " "
Cucumber	6c. " "	8-10c. " "
Egg Plant	8c. " "	12c. " "
Lettuce	1-2c. " head	3-4c. " head
Marrows	4c. " lb.	6c. " lb.
Okras	30c. " 100	3 pods for 2c.
Peppers	30-40c. " "	3 peppers for 2c.
Pumpkins	6c. " lb.	8c. per lb.
Shallot (green)	30c. " "	36c. " "
" (dry heads)	48c. " "	—
Potatoes	10c. " "	12-16c. " "
Thyme	60c. " "	84c. " "

* Prices controlled by Regulation.

(g) *Tree Crops*. All the main tree crops—pears, mangoes, bananas, coconuts, etc. — were in satisfactory supply in season. There was little change in prices at the end of March, 1950 from those obtaining at the same time in 1949. These prices are as follows:—

TABLE III

Tree Crops	Price to Growers in St. Michael	Retail Selling Price
Bananas	36c. per 100 (green)	3 for 2c.
Coconuts (Water)	\$6.00 " "	8c. each
Limes	72c. " "	1-2c. "
Mangoes	\$3.00 " "	4-5c. "
Pears (Avocado)	\$4.00—\$5.00 per 100	8c. "

Pests and Diseases. Pests and diseases of the chief economic crops were kept well under control, and few complaints were received during the year. Cultivators, generally, displayed a willingness to carry out control measures but were handicapped by lack of proper spraying equipment

Peasant Livestock and Animal Husbandry. The most noteworthy point in connection with peasant livestock is the tendency among so many livestock owners to carry more stock than they can conveniently accommodate on their small holdings. As a result, some peasants find it extremely difficult to obtain fodder for their animals during the lean months. This was particularly noticeable towards the end of the dry season in 1949. The previous year's record low for the number of cattle slaughtered at the Bridgetown Public Market was beaten in 1949 when there was a further drop of 144 below that for 1948. The number of pigs slaughtered, however, showed an appreciable increase, being considerably more than that for any year since 1944. A summary of animals, slaughtered at the Bridgetown Public Market is given below.

TABLE IV
No. of Animals Slaughtered in Bridgetown Public Market

Animals		1947	1948	1949
Cattle		2,756	2,089	1,945
Calves		603	690	678
Sheep		2,650	2,767	2,535
Goats		476	561	560
Pigs		5,430	6,708	7,584

Balanced Animal Feed was in free supply throughout the year. The price, however, was increased in November, 1949 from \$5.16 to \$5.64 per 100 lb. Fodder was in short supply from April to June, 1949, and the price of green cane tops in the Bridgetown area rose to as high as one dollar per 100 lb. The average price during the rest of the year ranged between 48c. and 60c. per 100 lb.

The Peasants' Loan Bank. The Peasants' Loan Bank continues its important function of providing short and medium-term credit to peasant owners of land. Steady progress was maintained, the number of persons obtaining loans during the year being the second highest since the Bank was established in 1937.

The position is shown in the following statement submitted by the Manager of the Bank.

TABLE V
Statement on Loans made during the Year

	1947-48	1948-49	1949-50
Number of loans granted during the financial year 1st June to 31st May	435	430	515
Short term loan accounts opened during the previous financial year (for cultivation, manures, taxes) and still outstanding during current financial year	55	94	49
Long term loan accounts opened during the previous financial years (for repayment of Mortgages, Purchase of Livestock and Irrigation) and still outstanding during current financial year	257	205	308
	747	729	872
Less extensions of Loans included in (1) above	24	13	7
Total number of accounts on books during the financial year	723	716	865
Amount of loans advanced	\$25,809.00	\$24,545.00	\$35,603.00

Mechanisation. The equipment available for contract ploughing proved inadequate to cope with the increasing demand for mechanized cultivation on peasant holdings. Some cultivators, after waiting on the plough until it was too late to take advantage of the first rains, were in the end compelled to revert to hand cultivation of their holdings. The system by which estate owners undertake to plough peasant plots on contract has given satisfactory results in the past, and the contractors have proved very co-operative. It appears, however, that more ploughs are required in order to keep pace with the demand for deeper and better cultivation. Prices charged for contract ploughing were as follows:—

Sub-soil ploughing 12—18" deep, with cuts 18" apart in Christ Church, St. Andrew and St. Philip ..	\$12.00 per acre
Sub-soil ploughing with cuts 18" apart, and furrowing on contour, 5' wide, in St. Philip	\$25.00 „ „

Marketing. Except on one or two occasions, with respect to vegetables, there were few complaints of marketing difficulties during the year. For a short period the supply of sweet potatoes exceeded the demand and, as in the previous year, the Government Cassava Factory bought up the excess for processing and incorporation into the Balanced Animal Feed. During February and March, 1950, growers of garden vegetables found it difficult to dispose of their crops, especially tomatoes, carrots, beets and cabbages. Prices fell during this time and many cultivators were left with crops on their hands. These crops depend for their distribution mainly on the hawker system which, of course, cannot be expected to adapt itself to deal adequately with periods of glut.

Peasant Holding Competitions. Both the Vegetable Gardens and Peasant Holdings Competitions took place as usual in connection with the Agricultural Society's Annual Exhibition. Judges for the competitions were the Deputy Director of Agriculture and other senior officers of the Department. Fifty-six vegetable gardens and twenty-five peasant holdings were entered for the respective competitions. The leading entries in each of these competitions were excellent, and on the whole a commendable standard was achieved.

B. The Work of the Department's Peasant Agricultural Extension Services

Staff. Mr. C. B. Cummins, Peasant Agricultural Instructor attached to the St. Michael area, resigned from the service on medical grounds as from October 20th, 1949.

The six additional Peasant Agricultural Instructors engaged on probation from September 16th, 1948 were confirmed in their appointment after the completion of a year's probationary period. They were then posted to district work under the supervision of the more experienced Instructors, before being assigned to districts of their own. One other Pupil Instructor, Mr. E. L. Murray, completed one year of probation at the end of March, 1950.

The Peasant Agricultural Extension staff on March 31st, 1950, therefore consisted of a Senior Peasant Agricultural Instructor, fifteen Peasant Agricultural Instructors and one Pupil Instructor.

Visits to Peasant Holdings. The Peasant Agricultural Instructors paid 4,990 visits to peasant holdings during the year, as compared with 5,153 the previous year. The instructions given and the co-operation of the cultivator in carrying them out are, however, much more important criteria than the number of visits paid. It is, therefore, pleasing to record that better systems of agriculture are being practised and an all round general improvement in cultivation methods and crop and animal husbandry developed as a result of

this personal contact between the Department's extension staff and the peasant.

School Gardens. One hundred and forty-two visits were paid to school gardens by the Peasant Agricultural Instructors. The value of the suggestions to the teachers and the instructions to the pupils given on these occasions is reflected not only in the improved school gardens, but in the gardens that some of the pupils are encouraged to keep at their homes. A great deal still remains to be done in connection with this latter aspect of the work.

Fifty-three school gardens were entered for the Annual School Gardens Competition. Inspections were carried out once a term, as usual, by the judges who comprised the Plant Diseases Inspector and the Senior Peasant Agricultural Instructor. A noticeable feature of this year's competition was the standard of excellence reached by some gardens at girls' schools. In short, there was a marked increase in the number of good gardens and a generally improved standard.

Meetings. Fourteen meetings of peasant cultivators were organised by the extension staff. These were mainly "cottage" meetings organised to meet some specific need such as the stimulation of interest in co-operation, the formation of fertilizer groups, or to discuss methods of increasing cotton production, to mention a few. A Farmers' Day was organised at each of the six District Agricultural Stations. This was the third annual series of these functions and the attendance and interest were well maintained.

Judging Rings and Youth Work. The attempt to stimulate interest among young people in agricultural pursuits through the judging ring technique was continued. Inter-parish judging ring competitions on dairy cattle and mutton sheep were held at various Farmers' Days during the year. This was climaxed by the Second Island-wide Judging Ring Rally on dairy cattle and mutton sheep held on the grounds of the Boys' Foundation School, Christ Church, on June 8th, 1950. Seventeen parish teams of three members each competed as compared with ten teams last year. Altogether, the function was well attended and a good standard set by the youthful participants.

Mainly as a result of the enthusiasm and organising ability of the Instructor in charge of the Jerusalem Agricultural Station, the St. Peter and St. Lucy Judging Ring Groups were combined in June, 1949, to form the Leeward Young Farmers' Club, the first organisation of its kind to be established by the Department. Membership in the club is open to young men and women in the district over fourteen years of age. During the year an interesting programme was carried through, including gardening, handicraft, and an eight-weeks course on horticulture conducted by the Senior Peasant Agricultural Instructor. Before any attempt is made at the establishment of similar groups, the development of this pioneer club is being carefully fostered and its progress studied.

Soil Conservation. The importance of contour cultivation as a soil conservation measure is only gradually becoming appreciated among peasants, and this is chiefly as a result of demonstrations conducted by the Department and the example set by some estates. Many small cultivators are willing to adopt the system but are handicapped by difficulty in getting labour to do this type of work. Despite this, the peasant extension staff supervised twenty-nine soil conservation projects on peasant holdings during the year, as against eighteen the previous year.

Irrigation. Satisfactory progress was made under the Colonial Development and Welfare Scheme for assisting peasants with irrigation. Large numbers of applications for assistance under the scheme continue to be received. Those approved ranged from complete overhead spraying units with gasoline engine-driven centrifugal or electrically-powered pumps down to applications for a few lengths of pipe or a storage tank. The trend towards overhead irrigation based either on gasoline engines or on windmills and gravity pressure from raised storage tanks has been very marked.

The District Agricultural Stations. The six District Agricultural Stations on which the extension services are based, functioned for the greater part of the year along similar lines to last year. That is, each station was operated as a single large unit comprising two main divisions, viz., the stud centre and the demonstration holding run on mixed farming lines. As will be seen from the table below, even the smallest of these stations "Bullen", is over ten acres in extent, while the average size of a peasant holding in Barbados is just over $\frac{1}{2}$ acre. In order to obtain data that could more usefully be applied to the small peasant holding, some slight reorganisation was found necessary so as to provide for the establishment on some of the stations of small peasant investigational units comparable in size to the average peasant holding in the area. Accordingly, at "The Home" two holdings of $1\frac{1}{2}$ and $2\frac{1}{2}$ acres, respectively, have been laid down in duplicate, two with irrigation and two without. At "Sayes Court" one holding of $1\frac{1}{2}$ acres has been demarcated within the Station to investigate the possibilities of intensive market gardening cum livestock under irrigation. At "Jerusalem" work is being carried out on a $1\frac{1}{2}$ -acre mixed farming unit, while at "Haggatts" two similar holdings have been marked out of $1\frac{1}{2}$ and $2\frac{1}{2}$ acres, respectively. Detailed cost accounting will be kept of each of these units, and it is expected that information of considerable value to peasants in the respective areas should be obtained.

The following table gives some information regarding the Stations:—

TABLE VI

Station		Parish	Total Area (Ac.)	Arable Area (Ac.)	Date of Starting	
The Home		St. Philip	18.12	14.00	April	1944
Sayes Court		Christ Church	11.60	8.90	June	1944
Groves		St. George	20.10	14.00*	October	1944
Jerusalem		St. Peter	15.66	11.00	December	1944
Haggatts		St. Andrew	13.75	7.00	October	1944
Bullen		St. James	10.48	7.00	February	1945

* Seven acres of the Groves Station are used by the British West Indies Central Sugar Cane Breeding Station.

The Stud Centres. It was at times impossible to satisfy the heavy demands made on the stud animals during the year. At the same time there was no alteration in the fees charged, which were as follows:—bulls 72c., buck goats and ram sheep 18c. and boars 48c. This retaining of the old level of service fees despite rising costs of maintaining the stud animals meant, of course, increasing the burden on an already heavily subsidised service. Justification for this, however, may be found in the general rate of improvement in the breeding up of all classes of livestock in the Island. Indeed, it is feared that the rate at which this grading up is proceeding threatens to out-strip the average peasant's ability to feed and manage adequately the more highly graded animals.

TABLE VII

Average No. of Sires standing at Stud during the year 1949--50

Station	Bulls	Buck Goats	Ram Sheep	Boars	Total
The Home	2	3	1	2	8
Sayes Court	2	2	2	2	8
Groves	5	3	2	3	13
Jerusalem	5	2	1	2	10
Haggatts	3	3	1	1	8
Bullen	—	1	1	2	4
Total	(1) 17	(2) 14	(3) 8	(4) 12	51

- (1) Guernsey 11, Jersey 1, Holstein 5.
 (2) British Alpine, Saanen.
 (3) Black Belly Mutton Sheep.
 (4) Berkshire and Large Black types.

Services paid for at the six Stations during the year to March 31st, 1950 were as follows : —

TABLE VIII

Number of Services paid for in 1949-50

Station	Bulls	Buck Goats	Ram Sheep	Boars	Total
The Home	188	190	93	213	684
Sayes Court	58	248	63	141	510
Groves	397	327	175	280	1,179
Jerusalem	542	307	49	99	997
Haggatts	436	267	149	43	895
Bullen	—	101	54	105	260
Total	1,621	1,440	583	881	4,525

If the free return services and the services to Station dams be taken into account, it will be seen to what extent the sires, especially the bulls, continued to be over-worked. The average for the bulls worked out at over 130 services per bull for the year. Investigations into the conception rate are continuing.

The Financial Returns of the Stud Services. The cost of upkeep of the stud animals showed a slight increase over last year's, detailed costings for which were given in the last annual report. Maintenance costs amounted to about three-and-a-half times the revenue received in service fees. The service, therefore, continues to be heavily subsidised.

The Demonstration Side of the District Agricultural Stations. This side of the Stations' work has been concerned in the past mainly with rationalizing and improving existing mixed farming systems of agriculture in the areas served by the respective Stations. With this end in view, suitable rotation systems, crop diversification, soil conservation measures and a proper balance between cash and food crops on the one hand, and crop and livestock on the other, are being worked out and demonstrated. The proposed reorganisation of the Stations should give more practical effect to this work in the future.

TABLE IX

Data Concerning the Cropping of the Stations
during 1949—50

Area of Crops	The Home	Sayas Court	Groves	Jerusalem	Haggatts	Bullen
Plant Cane (ac.) ...	3.00	2.00	1.23	2.00	—	1.50
First Ratoons (ac.) ...	2.90	2.00	1.58	1.75	—	1.50
Second Ratoons (ac.) ...	—	—	1.43	0.75	5.50	0.50
Thrown-out for Sweet Potatoes & Corn (ac.)	3.00	—	1.42	2.00	1.00	1.00
Thrown-out for a second year (ac.) ...	1.00 (Cotton)	1.80 (Guinea Corn and Vegetables)	—	2.00 (Guinea Corn and Ground-nuts)	—	—
Preparation, i.e. Yams (ac.) ...	3.00	1.80	1.23	2.00	—	1.50
Garden Plot (ac.) ...	0.25	0.20	0.11	0.25	0.50	0.25
Experimental Plot, Fodder etc. (ac.) ...	0.33	1.10	—	0.125	—	0.75
Foreman's Plot (ac.) ...	0.50	—	—	0.125	—	—
Total Arable Acres	13.98	8.90	7.00	11.00	7.00	7.00

TABLE X

Crop Yields during the Year July 1949—June 1950,
calculated on a per Acre basis

Crop	The Home	Sayas Court	Groves	Jerusalem	Haggatts	Bullen
Plant Cane (tons) ...	26.20	25.82	36.58	23.46*	—	21.54
First Ratoons (tons) ...	19.15	22.06	31.01	19.87	—	21.06
Second Ratoons (tons) ...	—	—	28.67	13.60	18.68	18.30
Yams (lb.) ...	6,845	2,639	5,500	6,970	—	1,660
Sweet Potatoes (lb.) ...	5,600	5,466	6,964	7,400	—	5,768
Guinea Corn (cut green) (tons) ...	26.66	21.22	—	14.50	—	—
Cotton (seed cotton) (lb.) ...	856	—	—	—	—	—
Groundnuts (lb.) ...	3,027	800	—	900	—	—
Cassava (sweet) (lb.) ...	—	—	—	6,960	—	—

* The plant canes at Jerusalem were irrigated for part of the year and cut back twice for fodder, yielding 8,200 lb. green cane tops per acre.

The general economy of the Stations was boosted, as usual, by revenue from a wide variety of minor crops, inter-planted with the main crops, grown as "catch" crops or in the vegetable garden. The use of irrigation at Jerusalem was limited to about six months of the year owing to a breakdown in the pumping equipment. Some delay was experienced in obtaining replacements from the United Kingdom. Installation of irrigation units at Sayes Court, Bullen and The Home was completed towards the end of the year, so that the use of irrigation on a field scale at these Stations should be reflected in increased production next year.

In keeping with the mixed farming programme, the livestock establishment at the Stations, in addition to stud animals, included dairy cows and breeding sows. The distribution of livestock at the Stations during the year was as follows:—

TABLE XI

Average Livestock Establishment during the Year 1949—50.

Livestock	The Home	Sayes Court	Groves	Jerusalem	Haggatts	Bullen
Stud Animals	8	8	13	10	8	4
Cows	5	5	4	4	1	1
Calves	2	2	2	2	—	1
Milch Goats	2	—	—	1	1	2
Goat Kids	2	—	—	—	1	—
Sows	3	3	3	4	2	2
Donkeys & Mules	1	1	1	2	1	1
Total	23	19	23	23	14	11

Livestock products sold included milk and young weaned pigs. The demand for the latter has always been greater than the supply. The number of young pigs sold during the year was as follows:—

Young pigs raised and sold during the year

	The Home	Sayes Court	Groves	Jerusalem	Haggatts	Bullen	Total
Average No. of Sows ...	3	3	3	4	2	2	17
No. of Weaners Sold ...	31	37	30	38	21	34	191

Some Stations, in addition, retained some of their young pigs for replacing older sows.

The Financial Returns of the Demonstration Side of the Stations. The last annual report listed the factors affecting the financial returns of the Stations. These factors still continue. As a result, the Stations do not show a financial profit. In fact, the over-all financial picture of the year's working of the six Stations taken together is very similar to that for the previous year. This is shown in the following summary of the revenue and expenditure of the six Stations together:—

*Statement of Revenue and Expenditure for the Year
1st July to 30th June.*

Expenditure:

	1948—49	1949—50
Total expenses for the six Stations ..	\$28,934.84	\$30,188.70

Revenue:

Actual receipts brought to account for the six Stations ..	20,689.39	21,481.26
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- N.B.* (i) These figures include revenue from stud service fees and actual expenditure on the stud centre.
 ii) Salaries of the Agricultural Instructors in charge of the Stations and depreciation, if any, have not been included in the expenditure.

SECTION II.

SUGAR CANE BREEDING AND SEEDLING TESTING

BY

B. deL. INNIS

Botanist, B.W.I. Central Sugar Cane Breeding Station

Sugar Cane Breeding

Sugar cane breeding was carried out at Groves Agricultural Station from October, 1949, to January, 1950. Arrowing was poor and irregular, and many desired crosses could not be made. Ninety-six breeding lanterns in all were used, including seven for the Cytogeneticist's selfs and line-breeding crosses. Over sixty thousand seedlings were obtained, of which about thirty-one thousand were potted.

Details of the crosses made, and seedlings obtained, potted and planted in the field are available in the Annual Report of the B.W.I. Central Sugar Cane Breeding Station.

Reaping of First Year Seedling Trials

Three hundred and eighty-two seedlings were selected at the reaping of the B.s.50' and B.50' series, of which details are tabulated in the Annual Report referred to above.

Seedlings of B.s.49' and B.49' Series.

These were multiplied and subjected to selection at Codrington. They were planted in Second Year Trials at Codrington (2 trials) and at Clifton Hall and Henley. The B.s.49' series was planted in June at Codrington for a short-season trial under irrigated conditions. They represent selections made primarily for British Guiana.

Seedlings of B.s.48' and B.48' Series.

These were cut at Codrington (2 trials), Bowmanston and Hothersal. Twenty-nine selections were made, four of which were for breeding only. Some will be tested further in Barbados, and in October, Colonies which contribute to the Central Sugar Cane Breeding Station will receive selected consignments. Particulars of the performance of each selected seedling are given in the Station's Annual Report.

Seedlings of the B.s.47' and B.47' Series.

These were reaped as ratoons in Second Year Seedling Trials, and the most promising ones planted in November, 1949, in Third Year Trials for the 1951 crop.

Seedlings of the B.46' Series.

Plant-cane Third Year Seedling Trials including these seedlings were cut during the crop season. Most promising were two, numbered B.46223 and B.46397, neither of which the Cytogeneticist was able to distinguish morphologically from B.41211. B.46397, generally, gave small but statistically insignificant

nificant increases in yield over B.46223. Further investigations are being made to ascertain whether these clones are identical with B.41211.

Other seedlings of the B.46' series which gave some good results were B.4604, B.4681, B.4691, B.46102, B.46136 and B.46364, all of which were comparable with the standard varieties.

Seedlings of the B.45' Series.

B.45151 and B.45152 gave very good results, but the former has rather thin canes, and the latter is difficult to clean due to closely-clinging trash. B.4572 appears promising for low rainfall areas, but arrows too heavily for higher rainfall areas. B.4596 gave heavy yields of cane, but of rather low quality.

S.45, tested with this series, gave some heavy yields, but the canes were frequently beginning to rot, resulting in low juice qualities. Even in trials where rotting was less in evidence, sucrose in juice was below that of the standard varieties, and S.45 is regarded as unreliable for commercial cultivation.

B.45267 yielded well in ratoons, but is too thin for commercial cultivation, while B.45188, B.45189 and B.45270 all were better than the standards, though inferior to B.41227 and B.41211.

Seedlings of the B.44' Series.

The best of these were B.4466, B.44101, B.44111, B.44182, B.44278 and B.44341, though none of them showed sufficient improvement over the standard varieties to be recommended for trial commercially.

Seedlings of the B.43' and Earlier Series.

Plant cane variety trials were reaped at Ealing Grove (low rainfall), Warrens, Small Ridge and Bulkeley (intermediate rainfall), Portland and Mount (high rainfall). First ratoons were reaped at Guinea, and third ratoons at Lancaster and Mount Wilton (all high rainfall). Details of the trials are available in the Annual Report of the B.W.I. Central Sugar Cane Breeding Station, and the following are the general conclusions, so far as the best varieties are concerned, from the season's trials:—

B.41211 was the outstanding seedling of the year, giving excellent results in every trial. It is capable of giving heavy yields of plant and ratoon cane, and when ripe has a reasonably good juice. As plant cane, it normally ripens early in the crop season, and ripening is associated with a yellowing of the leaves. The canes tend to rot rather quickly after maturity, so that the ripe crop should not be allowed to stand more than three or four weeks. If cut before mature, the juice of B.41211 will be of poor quality, and such complaints as have been received about poor juice quality in this variety have been at times when the canes were unripe. Ratoon canes of B.41211 appear to mature later and stand longer than plant canes.

B.41227 also gave excellent results, though it was favoured by the growing conditions which resulted in light arrowing. In more normal seasons it arrows heavily, and if left standing too late in the crop season, many of the arrowed canes dry out. The variety ratoons powerfully, and has very good juice quality when ripe.

B.4362 again showed exceptionally high juice qualities. This variety, while giving somewhat lower cane yields than the standards, is of such

excellent quality that it might find a place in commercial cultivation for early reaping, particularly where arrowing does not seriously limit cane growth.

B.43337 and B.43391 yielded reasonably well in some trials, but were outclassed by other varieties—notably B.41211.

B.44341 gave disappointing results. It arrows heavily, though the arrowed canes produce side shoots and thereby remain sound until the crop is cut. The juice quality is good, but cane yields are not so good as earlier trials appeared to indicate.

SECTION III.

BOTANY

Propagation and Distribution of Ornamental Plants

The propagation and distribution of ornamental plants was continued during the year. The number of plants distributed is given in Table I.

TABLE I

Year						No. of Plants Distributed
1948-49	..	..	..	..	..	4,945
1949-50	..	..	..	..	..	5,656

Distribution of Vegetable Seeds from the Department's Office

This distribution aims at encouraging the purchase of vegetable varieties which are known to be suited to local conditions. The Department purchases these seeds from reliable firms and sells them in small quantities at cost. The quantities distributed are given in Table II.

TABLE II

Seed	Variety	Amount — Lb.	
		1948-49	1949-50
Beans	Bountiful	6,361	5,526
"	Kentucky Wonder	10	24
"	Lima	25	22
"	Fordhook	20	16
"	Ideal		
Beet	Detroit Dark Red	180	175
"	Early Blood Turnip	5	5
"	Eclipse	5	
"	Early Egyptian		32
Cabbage	Hatsings Sure Crop	3	8
"	Danish Ballhead	10½	10
"	Late Flat Dutch	3	11
"	Wakefield Charleston	9½	9
Cantaloupe	P.M.R. No. 45	1½	
Carrot	Chantenay	32	28
"	Danvers	120	165
"	Oxheart	252	142
Cauliflower	Sutton's Early Market	8	8½
"	Sutton's Early Patna	—	4½
Cucumber	Henderson & Local	18	
Egg Plant	Black Beauty	3	8½
Kohl Rabi	Extra Early White Vienna	5	1½
Lettuce	Mignonette	52	42½
"	Black Seeded Simpson	12	12½
Onion	Crystal White Wax	2	½
"	Early Grano	½	2½
Parsley	Emerald		—
Pea, Black eye	Dixie Queen	120	
Pepper	Ruby King	1	½
Radish	Icicle	—	1½
Radish	Scarlet Globe		5½
Squash	Delicata	5	3½
"	White Buch Scalloped	—	5
Swiss Chard	Lucullus		2½
Tomato	Bounty	5	6
"	Early Chatham	5	3
"	Extra Early Prolific	2	4½
"	Marglobe	29	41
Turnip	Purple White Globe		20½
Total		7,408	6,314

Propagation and Distribution of Economic Trees.

(a) *Citrus*. Eight types of citrus trees were propagated and distributed, i.e., lime, orange, grapefruit, shaddock, lemon, mandarin, pomelo and citron. The scion material consisted chiefly of budwood from local vigorous seedling trees and, to a less extent, of commercial varieties imported from Trinidad and established in the orchard at Codrington Experiment Station. The stock used was sour orange grown from seed imported from Trinidad.

During the year, a total of one thousand, two hundred and fifty budded citrus plants were distributed at a price of six cents to peasants and twenty-five cents to others (see Table III).

(b) *Dwarf Coconuts*. Coconuts of the 'dwarf' variety, which come into bearing in three to five years, were imported from St. Lucia and distributed. Forty hatched and one thousand, one hundred and twenty-three unhatched nuts were distributed.

TABLE III
Distribution of Economic Trees

Species	Varieties	Total No. of Plants Delivered	
		1948-49	1949-50
Citrus:			
Citron ..	Trinidad ..	1	—
Grapefruit ..	Foster, Duncan, Marsh, Walters, Claybury Nos. 1 & 2 ..	69	257
Lemon ..	Claybury, Layne House ..	10	32
Lime ..	Codrington, Claybury, Tahiti Lisbon ..	244	545
Mandarin ..	Dancy, Claybury Nos. 1, 2 & 3 ..	46	56
Orange ..	Tardiff, Parson Brown, Navel, Layne House Nos. 1 & 3, Ruby, Pineapple, Claybury Nos. 1, 2 & 3 ..	192	289
Pomelo ..	Codrington ..	17	19
Shaddock ..	Burkes Village, Claybury Nos. 1 & 2 ..	31	52
		610	1,250
Avocado Pear	Selected seedlings ..	180	170
Miscellaneous:			
Breadfruit ..		31	8
Breadnut ..		—	1
Barbados Cherry		10	8
Fig ..		10	23
Guava ..		109	111
Grape ..		9	8
Golden Apple ..		14	23
Genip ..		4	—
Grenadilla ..		2	—
Pawpaw ..		58	53
Sugar Apple ..		3	20
Soursop ..		6	17
Water Lemon ..		4	14
		260	286
Dwarf Coconuts	40 hatched, 1,123 unhatched	4,336	1,163
	Total ..	5,386	2,869

Afforestation.

Distribution of Trees. Twelve thousand, one hundred and nineteen casuarina and mahogany trees in pots were distributed free of cost during the year.

SECTION IV

CHEMISTRY

BY

J. B. D. ROBINSON,
Chemist

Soil Investigational Work.

(i) Major Plant Nutrient Investigation

Work on the soil samples connected with this investigation has been proceeding. The analyses results for soil organic carbon are now complete. Total and exchangeable phosphate will be completed before the end of 1950. The results of the organic carbon analyses are given in Table I.

TABLE I

Soil Type	Number of samples		Mean per cent.	Organic carbon
	A	B	A	B
Red	10	18	1.57 ± 0.090	1.94 ± 0.082 **
Inter. Red	5	4	1.48 ± 0.064	2.20 ± 0.193 **
Inter. Black	8	10	1.35 ± 0.071	1.90 ± 0.136 **
Ch. Ch. Ridge	15	14	0.96 ± 0.056	1.54 ± 0.333 *
Black	18	11	1.16 ± 0.058	1.65 ± 0.196

Notes :

A = number of samples taken and the results of analyses in 1929-32.

B = number of samples taken in 1947 and the results of analyses of these samples in 1949-50.

* = Significant at p 0.05

** = " " p 0.01

The difference between the number of soil samples taken in each soil group is a reflection of alteration in field boundaries. In a few cases only it was not suitable to sample the same field, and samples were taken from fields adjacent.

Although variation between individual analysis in any one soil type is greater for the 1949-50 results, there is still a significant difference, indicating an increase in soil organic matter under the manurial practices based on the results of the work carried out by Sir John Saint during the period between the sampling.

A fuller report and discussion will appear when all the results of this investigation are completed.

(ii) Soil/Moisture conditions related to Irrigation practice

Owing to shortages of staff in the Department and the difficulty in obtaining a set of the electrical resistance soil moisture testing apparatus (nylon resistance blocks), no further investigation into soil moisture relationships on the coral limestone soils have been carried out. Further intensive investigation is planned for the time when both personnel and apparatus are available.

The problem of chloride accumulation in the clay coral soils from the application of irrigation waters has been discussed and in this connection a visit was made to a black coral soil area where surface irrigation with well water has been practised for a number of years. Ten soil samples were taken from irrigated and non-irrigated land for chloride determinations. There was some indication that chloride accumulation had taken place in the soil, particularly in the beds between the furrows, but the soil chloride content was well below the toxicity level for commercial sugar cane growing.

(iii) Investigations into Trace Element Deficiency of Coral Limestone Soils

It has not been possible to give much attention to work on these investigations during the year. However the Laboratory now possesses a Hilger-Watts Spectrophotometer for use in foliar analysis connected with these investigations. Some leaf samples (sugar cane and horticultural crops) have been taken already, and are being stored, until the arrival of a small mill for grinding, prior to analysis.

The use of solutions of iron and manganese was tried in a more practical type of investigation. A solution of 0.025% ferrous sulphate in 0.025% sulphuric acid as a spray for stringless beans which showed severe chlorotic symptoms was a success in so far as it resulted in the greening up of the sprayed leaves. The crop was being grown on a calcareous black coral soil.

It is felt that the use of the foliar diagnosis techniques during the coming year will throw more light on the causes of the several symptoms observed. (Annual Report 1948-1949, Section IV sub. section 3.)

(iv) Soil Survey of Agricultural Stations

The seven soil samples reported as having been taken last year have now been analysed. No further samples have been taken from the remaining areas at the Stations to date.

(v) Other soil survey

A soil fertility survey was carried out at the Pine Plantation. The forty acres of land which originally constituted the irrigation scheme area were sampled field by field to a depth of six inches. Soils pits were dug at intervals over the area and the land grouped in the Turner system (grouping on the basis of natural soil profile drainage). This work was completed and a full report submitted.

Soil Erosion and Conservation.

(i) Field Work

During the year eighty-six visits were made to different plantations in the Island for the purpose of either laying down contour systems, inspecting and adjusting contour layouts already undertaken or discussing plans for proposed contour systems.

A contour cultivation demonstration was held in July, 1949 at Pickerings St. Lucy, with officers of the Department present to answer any questions. Twenty-three Planters were present. Arising from this meeting eight requests for further discussion and assistance were received by the Agricultural Chemist.

(ii) Lectures

A talk on Contour Cultivation was given at The Home Agricultural Station, St. Philip, on the occasion of a Farmers' Day.

A lecture entitled 'Some notes on soil erosion and its control' was given before a meeting of the Barbados General Agricultural Society in November.

(iii) **Investigation of soil slippage (slumping) in the Scotland Soil area**

Several visits were paid to Spring Vale and Parks Plantations, for the purpose of studying further the causes of land slippage, and means of its control. With the depth of cultivation limited to that of hand forking, saturation of this cultivated soil occurs with the onset of rains. After saturation water collects over the uncultivated soil below, because the gravitational drainage is very slow. A type of liquid mud is formed, giving lubrication to the soil above, and slippage occurs over this layer. (Slumping as termed by H. H. Bennett in his book "Soil Conservation"). This occurs very generally on the sloping group IV (Turner's Classification) soil types in the Scotland area.

The 2% graded contour layout has not proved a satisfactory control. Further experimental work is planned. In connection with these investigations sixteen soil samples were taken for analysis.

(iv) **Investigation into the effects of soil erosion on soil fertility in terms of plant nutrients.**

Soil samples to a depth of six inches have been taken on two soil types in areas subject to erosion (sheet washing and incipient gullyng) with a view to collecting data on soil fertility losses under these conditions.

Table II gives certain analysis results.

TABLE II

Soil Type			Exchangeable K ₂ O lb. per acre 6" topsoil	Total Nitrogen lb. per acre 6" topsoil	Organic Carbon (per cent.)
Black Coral Soil	(a)	..	712	4,256	1.64
"	(b)	..	1,019	4,547	1.98
Chalky "	(a)	..	931	3,964	1.62
Scotland soil	(b)	..	925	4,166	1.81

Notes :

(a) is the sample taken from the eroded slope.

(b) is the sample taken from the wash soil area. lb. per acre six inches topsoil : assuming one acre six inches of soil weighs 1,000 tons.

The indications from these two sets of analyses are that soil fertility in terms of potash, nitrogen and organic carbon are being removed from eroded slopes as would be expected under these conditions.

At the Agricultural Exhibition in December a display demonstrating causes and effects of soil erosion, and methods of control was shown by this Department.

(v) **Contour Cultivation Survey**

A survey of the soil conservation work carried out in the Island was made in November by means of a circular communication to plantation managers. The results are of interest in that they give an indication of the progress which has been made in this type of work since 1942 when it was first advised by the Department.

The results of the survey of the two main soil groups are given in Table III

TABLE III

Soil Group			% acreage under complete contour system	% acreage under Key con- tour furrow & cane holes	% Residual acreage under cane hole system
Scotland soils	..	..	28.6	6.7	64.7
Coralline soils	..	..	2.4	2.5	95.1

Note :

- (i) complete contour system refers to the system of Key contour and contour furrows.
- (ii) Key contour furrow and cane holes refer to the system of Key contour furrows with cane holes in place of contour furrows.

In the interpretation of these figures there is one important factor to be considered in connection with the coralline soil group particularly. Not all the arable acreage in this area, approximately 6/7 of the total Island, is undulating. However the assessment of the proportion of flat lands which do not require any soil conservation practices is difficult, and would apply to a large extent in certain parishes only.

Thus assuming for this soil group that only 50% of the arable acreage requires the practice of soil conservation measures (and this is a very liberal estimate) still only 4.8% is under contour layout and a further 5% under a partial contour layout. These figures do not represent a very large area of the whole. In the Scotland soil group an area comprising approximately the remaining 1/7 of the Island, where erosion is more serious, the figures indicate a greater response to conservation practice.

Advisory Work

Visits followed by discussion were made to estates applying for advice in connection with soil fertility and cultivation problems during the year. In this connection seven soil samples were taken for analysis.

During the course of many visits to estates discussion on the subject of soil groups (Turner's Class) and soil tilth has taken place, and there is now a general awareness of the value of knowing what soil group the planter is concerned with in considering cultivation problems for a given area.

Advisory work of this nature has been undertaken by the Peasant Agricultural Instructors and is referred to in detail in another section of this report

Sugar Cane Investigational Work

(1) Manurial Trials with Sugar Cane.

The past growing season has been good and a record tonnage of sugar was produced. The rainfall, however, was not well distributed, there was a dry spell throughout July and the first half of August. On the last day of August very heavy rain fell. September and October were normal but November was well below average, and the rainfall was very poor. The rainfall in December was low, but January was wetter than average. The crop season from February to May was a wet one especially towards the end and ratoon canes which were cut later benefitted greatly.

A summary of the results of trials reaped is given below:—

Phosphate Trials

1. The investigation of the effects on yield of cane and sucrose per cent. in juice, of high nitrogen, as sulphate of ammonia: high phosphate as mono calcium phosphate manuring, were continued at a red coral limestone soil centre, and at a Scotland type soil centre. The trials were reaped as first ratoons. The variety was B.37161 at the red soil centre and B.41211 at the Scotland soil centre. At the Scotland soil centre plot results were so variable that no significant difference due to treatments was obtained in terms of tons of cane per acre or tons of sugar per acre. The effect of high nitrogen manuring with or without phosphate caused a significant depression of the sucrose per cent. in juice.

At the Red soil centre the results were more positive. Nitrogen alone or in combination with phosphate raised the yield of cane by as much as 18 tons of cane per acre but phosphate whether alone or in combination with nitrogen resulted in no significant yield increase. The yield of sugar per acre was raised by as much as $2\frac{1}{2}$ —3 tons by the application of nitrogen alone or nitrogen and phosphate, but phosphate alone or in combination with nitrogen caused no significant increase. There was no significant difference in the per cent. sucrose in juice due to different treatments in this trial.

II. A trial to determine the effects of phosphate fertilizer as mono calcium phosphate (superphosphate) on cane yield and juice quality in terms of sucrose in juice was reaped at Haggatts Agricultural Station. The variety was B.37161, second ratoons. There was no significant difference between plot yields due to any treatment nor was the per cent. sucrose in juice affected significantly.

III. At a black coral limestone soil centre a simple trial based on the A. B. B. A. method of Student was laid down to determine the effect on the cane yield of placing phosphate fertilizer (as mono calcium phosphate) near the cane stool against no phosphate. The variety was B.37161 first ratoons. There was no significant difference between treated and untreated plot yields.

IV. The trial on the red coral limestone soil at Todds' (high rainfall area, variety B.37161 first Ratoons) to determine the effect of later and/or heavier applications of nitrogen with mid and late crop reapings, on yield and juice quality gave similar results as previous trials of this type. The trial was moved to a high rainfall centre in order to ensure maximum utilization of the sulphate of ammonia. The results are best summarised as follows:

(i) There was no significant difference in yield results, in terms of tons of cane per acre or tons of sugar per acre, between the mid crop and late crop reaping of the treatments.

(ii) There was a significant yield increase of both tons of cane and tons of sugar per acre between plots receiving nitrogen either early, late, or split dressings and plots receiving no nitrogen.

(iii) Plots receiving early dressings, i.e., in June—July with the rains, all showed significant increases of tons of cane and tons of sugar per acre over plots receiving equivalent late dressings, i.e., October application.

(iv) There was no significant difference between different levels of nitrogen i.e. 4 cwts. and 6 cwts. per acre, applied either early or late.

(v) Where split dressings were applied i.e. 4 cwts. sulphate ammonia early and 2 cwts. sulphate ammonia late and vice versa, plots which

received the same total application, but the majority of it in the early application, gave yields that were significantly greater in the plots reaped at mid crop time, but not in the plots reaped at late crop time.

It is worth noting that in a good growing season the application of fertilizer to a crop in October, planted in the previous November, is a difficult matter owing to the size and density of the cane growth.

(ii) Manurial Trials to be reaped in 1951.

None of the manurial trials reaped this (1950) crop season will be retained as ratoons to be reaped in 1951.

The following trials have been laid down and will be reaped in 1951.

(a) At Bulkeley Plantation on a calcareous black group IV (Turner's Classification) soil a preliminary experiment to review fertilizer application (time and quantity) under new methods of soil management was laid down. This trial is to determine sugar cane yield and per cent. sucrose in juice under a system of nitrogen and phosphate manuring with a basic dressing of potash to all the plots. The fertilizer was placed together by the stool in November. The cane variety B.37161 was planted in September (1949); the land is under the system of Camber bed cultivation.

(b) Three trials in a high rainfall area, red coral soil type, and intermediate rainfall area and a low rainfall area, both black coral soil type, were laid down to determine the effects of time of application of a potash dressing. The soils were all group II's (Turner's Classification).

The soils of those experimental areas were sampled before application of fertilizer was made. The variety of cane is B.37161.

(c) At a red coral limestone soil centre in the high rainfall area a trial has been laid down to investigate the effects of the time and method of application of nitrogen and phosphate fertilizer.

The recommended potash dressing was applied as a basic dressing to all plots in January (1950). Nitrogen and phosphate fertilizers were applied together either by placing in the cane hole or broadcasting, some plots being treated early, in November 1949 and some plots with the commencement of rains, June 1950, which is the usual time of application for nitrogenous fertilizers. The variety of cane is B.37161.

(iii) Milling Laboratory.

The milling laboratory received six hundred and thirty-four sample bundles of cane for analysis in connection with Departmental manurial trials and the select seedling and variety trials of the British West Indies Central Sugar Cane Breeding Station.

(iv) Phosphate content of cane juices.

In addition to the customary routine analysis, samples of juice were taken during the milling of the manurial trial sample bundles for determination of juice phosphate. These samples were taken for the continuation of work started last year to determine the effects of season, variety and manurial treatment on the phosphate content in the juice. (Annual Report 1948—49). The work was extended also to the sampling of juice from the select seedlings. It is expected that the analyses will show any variation between the new varieties of cane, and will indicate any varietal differences which might affect juice clarification.

(v) **Investigation with the effect of an organo-mercurial dip (Aretan) on germination and tillering of sugar cane.**

The replanting of certain sugar cane areas after poor germination is an extra financial expense in the planting operation. This may occur if the weather is particularly dry prior to and during the month of November, or if the incidence of Pineapple disease (*Thielaviopsis paradoxa*) is at all heavy. A preliminary trial was laid down on a black coral soil estate in the intermediate rainfall area. The treatments consisted of :

- Treatment A no dipping of cane setts.
- „ B dipping of cane setts in $\frac{1}{2}\%$ solution of Aretan.
- „ C dipping of cane setts in 1% solution of Aretan.

In summarizing the results it must be noted that the planting of the cane was not carried out until January 10th 1950, following the removal of a sweet potato crop. Germination was slow and erratic. Germination counts were made on the plots (area of 100 cane holes per plot) at intervals of 38 days, 59 days and 170 days respectively. The plot counts of the treated plots (B and C) were consistently greater than the control plot (A). These counts showed a slow but steady increase in mean plot counts for each successive count but no significant difference except in the results of the count made 170 days after planting. In this case treatment B showed a significantly greater mean germination count than the control, treatment C was not significant.

A count of the number of tillers per plot was made 170 days after planting. Again the mean plot tiller counts were greater in the treated plots than the untreated (control) plots but the difference was not significant.

This trial is not being carried through to the stage of reaping the plots, but further and more extensive trials will be laid down in November, 1950.

(vi) **Foliar Diagnosis and Leaf injection.**

Some samples of cane leaves have been collected and stored for analysis at a future date. These samples were taken from the variety B.43391 which develops a yellow mottling leaf effect usually towards the end of the wet season. In collaboration with the Botanist of the Central Sugar Cane Breeding Station samples of this variety at Fisher Pond Plantation were tested by the injection technique with solutions of iron, manganese, and a third solution containing traces of the remaining elements known to be essential to plant growth. The control injection with Carbo-Fuchsin dye showed however that the injection technique used was not satisfactory, a spread of the solution over the leaf blade occurring only at the very tip of the leaf. A new technique will be tried this year.

Leaf samples from the phosphate manurial trials have also been collected. Samples are taken from the third leaf counting the unopened leaf as the first.

Trials With Food Crops.

(i) **Maize :**

Two further manurial trials with maize, to determine the effect on corn yield of different applications of artificial nitrogenous fertilizer, have been laid down on a red and on a black coral limestone soil type.

(ii) **Sweet Potatoes:**

A simple trial, to investigate the effects of tillage on the yield of potatoes (hand tillage versus mechanical ploughing) has been laid down on a black

coral limestone soil (Group II Turner's Classification) at Codrington Experiment Station. Owing to the early rains in May, the mechanical tillage was not carried out when the ground was dry enough to give the maximum beneficial effect.

Milk Analyses.

The system of monthly milk analysis of samples from the cows at the Central Livestock Station has been continued as a check on quality and for the purpose of milk records. The samples are taken for analysis on the first Tuesday in each month, and consist of afternoon and morning samples. A summary of the results of monthly analyses are noted in Table IV.

TABLE IV

Month				No. of samples (i.e. no. of cows)	per cent. Butter Fat	per cent. Solid not Fat (by cal- culation)
April	1949	..	..	20	4.3	8.7
May	"	..	..	19	4.5	8.0
June	"	..	..	19	4.6	8.7
July	"	..	..	18	4.5	8.5
August	"	..	..	16	4.3	8.7
Sept.	"	..	..	14	4.1	8.7
Oct.	"	..	..	12	4.7	8.8
Nov.	"	..	..	11	4.6	8.8
Dec.	"	..	..	13	4.5	8.8
January	1950	..	..	17	4.1	8.3
Feb.	"	..	..	19	4.3	8.7
March	"	..	..	22	4.3	8.9
April	"	..	..	22	4.1	8.8
May	"	..	..	24	4.0	8.6
June	"	..	..	24	4.1	8.5

N.B. These figures are weighted means obtained by sampling the milk of each cow at the afternoon and morning milking and mixing these in proportion to the yield, to give one cow's sample for analysis.

Over the period noted in the table above the milk quality of the herd at the Central Livestock Station was maintained at a satisfactory level.

Animal Nutrition.

(i) At the Central Livestock Station the feeding of maintenance and production rations to the dairy stock based on temperate zone feeding standards was continued. The physical condition, milk quality, and milk yields of individuals of either high grade Guernsey or Holstein Freisian was satisfactory.

(ii) In May a feeding trial was started with two groups of six cows using the double reversal technique. The animals taken from the two breed types in the herd were paired off as far as possible with regard to type, age, number and stage of lactation.

The objects were to determine the value of a maize silage supplement to the maintenance ration in terms of milk quality, milk yield and the general physical condition of the animal. On plantations at this time of the year, approximately May, until green fodder such as maize or Guinea corn is available, the basic feeds are dry cane tops and concentrates. The supplemented ration was made up of dry cane tops plus silage for maintenance, with a concentrate for production. This trial will last for nearly three months. A full report will be published at a later date.

(iii) In the correct feeding of dairy stock it is necessary to know the feed value of the ration constituents. A survey was made of all the available analysis results for fodders in the Department, and a table of the feeding values was compiled. This will be of use in future nutrition work here. (These results were published in *Tropical Agriculture* 1950—27, 56-58).

(iv) Some analyses of Yams and Sweet Potatoes were carried out with the object of determining their substitution rates for meal in pig feeding.

The conclusions arrived at from the data collected were that in older animals some substitution at the rate of 5 lb. of yams or 4 lb. of sweet potatoes per pound of Balanced Animal Feed could be carried out in a feeding programme

(v) Four samples of cane tops being fed to the dairy cattle at the Pine were taken for analysis.

(vi) A survey of the rations fed to different types of stock on the Agricultural Stations was made. Rations for heifers over six months, cows, and bulls were drawn up on the basis of available feeding stuffs at the different stations. Standards for pig feeding were also circulated to stations, to serve as a guide for rationing this type of stock.

(vii) Two other samples of Balanced Animal Feed residue were received, suspected of being contaminated with grit, dirt etc. In both cases the sample comprised mainly the mineral supplement, which is mixed in with the Balanced Animal Feed at source, which had tended to settle out and collected as a gritty residue. Samples of Balanced Animal Feed have been received periodically from Messrs. DaCosta & Co., Ltd., for analysis.

Fodder Investigations.

(i) Two maize fodder trials were harvested at intervals during the wet months of 1949, one at Codrington Experiment Station and one at Pine Estate. The trials were designed to determine the optimum time of cutting this fodder for ensiling measured in terms of total yield of dry matter per acre, yield of protein per acre, and yield of starch equivalent per acre. The trial was cut at four stages of growth, i.e. (a) when the first tassels have appeared, (b) when the silks have dried, (c) when the grain is at the milk stage (d) when the grain is at the glazing stage. The effect of different applications of nitrogenous fertilizer to the plots, two treatment levels, on the yield and analysis results were also observed. Sixty-four sample bundles were sent into the Laboratory for moisture determination and feedingstuffs analysis.

(ii) In the search for a suitable protein rich leguminous plant to grow with maize during the wet months for ensiling, local and imported species have been tried. The only one to show any promise is the Creeping Bonavist vine (*Dolichos sp.*) and trial plots are being grown at Codrington Experiment Station.

A variety of alfalfa named Africans, obtained through Dr. Jones from Trinidad has not proved successful in trial plots. The growth on the black coral soil type at Codrington Experiment Station was most unsatisfactory.

(iii) Samples of both Tower and Pit silages from the Central Livestock Station were taken for chemical analysis. At the same time preliminary investigations into the chemical quality of these samples were commenced.

(iv) A special investigation into the silage from one of the pits at the Central Livestock Station was made because of some small feeding trouble in

calves which developed and was thought to be caused by hyper acidity in the silage feed. The silage had been made of mature maize fodder, and analysis showed a high degree of acidity in the samples taken.

(v) Samples of Guinea corn fodder were taken from the Pine Plantation at different growth stages, for a preliminary investigation into the Hydrocyanic acid content, a factor to be considered when feeding this fodder to stock at certain stages of growth.

(vi) A perennial fodder trial with three fodders, Guatemala grass, Elephant grass var. Merker, and Elephant grass var. Uganda was planted in August at the Pine Plantation and the plots were supplied in September following. The layout was in the form of 3 x 3 latin square. Treatments were three cutting heights and two levels of nitrogen, applied after each cutting.

The variety of Elephant grass, Merker, has since been eliminated from the trials as it showed positive symptoms of the virus mosaic disease (suspected sugar cane mosaic). As the two remaining fodder types represent the most promising perennial fodders grown in the Island, the trial will be continued. To date 174 cuttings of plots in the trial have been made, and 58 samples taken for complete fodder analysis in the Laboratory.

Miscellaneous.

Numerous samples of Fancy Molasses for export were received in the Laboratory during the year for moisture determination. In addition to the official methods of vacuum oven drying in quartz sand, and Refractometer readings, a method of distillation with Toluene (after Dean and Stark) was also carried out on the samples for comparison. It is a method which is simple, and gives quicker results than the vacuum oven method. However the results obtained were consistently higher and further use of this method was abandoned.

An analysis was made of a sample of Quadruple Scale received from Sandy Lane Factory.

An analysis was made of a sample of Slag from the Apes Hill Lime Kiln.

An analysis was made of a sample of Anguilla sand used for liming the land in St. Kitts.

The Laboratory methods employed in Agricultural Analysis have been revised where necessary, and some new methods adopted.

Samples of cane, various varieties, have been sent to Dr. L. F. Wiggins at Birmingham where he is carrying out research work for the Colonial Products organization.

Publications.

The following bulletin and papers were written during the year.

- i. Manurial Trials with Sugar Cane. Bulletin No. 14 (New Series) Department of Science and Agriculture.
- ii. Soil Conditions and Sugar Cane Growth in Barbados. Pamphlet No. 18 (New Series) Department of Science and Agriculture.
- iii. The Results of Sugar Cane Manurial Trials with Phosphate in Barbados pt. I 1929-1948, pt. II 1947-1949. Proceedings B.W.I. Sugar Technologists' Association 1949.
- iv. The feeding of Dairy Cattle in Barbados, pt. I. The feeding value of some Tropical fodders. Tropical Agriculture 1950. Vol. 27, p. 56.

SECTION V.
GOVERNMENT LABORATORY

BY

J. B. D. ROBINSON
Ag. Government Analyst

Analytical Work

(a) FOOD AND DRUGS LABORATORY

The total number of samples examined during the year for the various Government Departments and for private individuals was 1,595.

The number and distribution of samples dealt with annually, for the past five years is set out in Table I.

TABLE I.

	1945	1946	1947	1948	1949
Police Department ..	343	261	236	205	274
Customs Department	42	75	98	95	126
Public Works Department	15	30	7	14	15
Agricultural Department	176	46	179	199	491
Parochial & Sanitary Departments ..	334	319	333	330	331
Agricultural Society	58	62	56	40	83
Other Government Departments ..	80	40	41	53	55
Private Individuals ..	108	140	153	235	220
Total	1,156	973	1,103	1,171	1,595

Particulars of the various samples analysed in the Food and Drugs Laboratory for 1949 are—

(i) **Police Department:**

Viscera, examination of poisons and exhibits ..	3
Coins and counterfeiting exhibits	1
Butters and cooking oils	25
Milks	153
Tea, coffee, cocoa etc.	26
Animal feed	7
Rum	27
Miscellaneous (not classified above)	32
Total	274

Viscera, exhibits and Examinations.

Three samples were received for examination, analysis and report.

Coins and Counterfeiting Exhibits. One sample was submitted during the year—this was counterfeit.

Butters and Cooking Oils. All samples were genuine.

Milks. Out of a total of one hundred and fifty-three samples received for examination, four samples were found to be adulterated by the addition of water.

Tea, coffee, cocoa etc. All samples were genuine.

Rum. All samples were found to be genuine and of legal strength.

Foods and Feeding Stuffs. The samples were all genuine and of satisfactory quality.

(ii) Customs Department

Butters and cooking oils	..	..	..	..	9
Tea, coffee, cocoa etc.	..	..	..	..	3
Feeding Stuffs	..	..	..	..	7
Hydrometers etc. for calibration	..	..	..	..	6
Milks	..	..	..	..	22
Petroleum	..	..	..	..	56
Rum	..	..	..	..	3
Miscellaneous (not classified above)	..	..	..	..	20
Total	..	..	..	..	126

Petroleums consist of gasolenes and kerosenes for density determination and Flash point.

Butters were for the determination of water content and quality.

Milks, condensed and powdered for fat determination and classification.

Rums for determining proof spirit.

Tea, coffee etc. for purity; cocoa essences for fat determination and classification. (Flours and cereal preparations for classification). Feeding stuffs for classification and six Hydrometers for calibration.

Miscellaneous. Under this heading were received:—

- (a) exhibits of clothing, and samples of concentrated sulphuric acid and caustic soda, connected with a case of acid throwing.
- (b) sample of black pepper which was found to be genuine.
- (c) samples of oxygen producing tablets which were the cause of a small conflagration in the General Post Office.

(iii) Water-Works Department

The usual quarterly analyses of the public supply were carried out as well as occasional checks on the water from the pumping stations and from the tap. Free chlorine, free and albuminoid ammonia was checked in samples likely to be contaminated.

(iv) Department of Agriculture

This includes the analysis of soil samples in conjunction with general advisory sugar cane, manurial trials and soil investigational work carried out by the Agricultural Chemist; the fodder analysis of samples collected from fodder trials being carried out.

The investigation of phosphate content of cane juice under poor soil and rainfall conditions continued and was expanded. Subject matter relating to these results, forms part of the report of the Agricultural Chemist.

(v) Sanitary and Parochial

The E.C. disinfectants produced by the Commissioners of Health were regularly submitted and checked for chlorine content.

Three hundred and twenty-eight samples of milk were submitted by the Commissioners of Health. Nine of these were found to be adulterated by the addition of water.

Two other samples, one of bacon and one of sugar, were submitted on the suspicion of being unfit or doubtful for human consumption.

(vi) Agricultural Society

Thirty-four samples of rum, twenty-nine samples of sugar and twenty samples of syrups were submitted, analysed and examined in connection with the prize awards at their Annual Industrial Exhibition.

(vii) Other Government Departments and Institutions

Samples of E.C. disinfectant submitted by the Barbados General Hospital Authorities were examined.

The laboratory carried out periodic checks on the quality of the gas as supplied by the Barbados Gas Company.

(viii) Private Analyses

Butters, margarines and cooking oils	..	..	..	4
Tea, cocoa, etc	..	..	..	2
Fertilizers	..	..	..	8
Feeding Stuffs	..	..	..	5
Instruments for calibration	..	..	..	4
Cane juices	..	..	..	46
Milks	..	..	..	23
Petroleum oils	..	..	..	2
Rums, spirits etc.	..	..	..	8
Sugar and Molasses	..	..	..	81
Viscera	..	..	..	1
Water	..	..	..	11
Samples not classified above	..	..	..	24
Total	..	..	..	220

(b) SUGAR LABORATORY

Sugars—complete analyses	..	..	..	696
polarisation tests only	..	..	..	2,299
Syrups—gravity and polarimetric test	..	..	..	1,440
samples for the Canadian market (moisture determination)	..	..	..	39
samples for the U.S. market (non-sugar solids determination)	..	..	..	13

In connection with the syrup samples for the Canadian market, the Agricultural Chemist carried out some investigational work on the comparison of results obtained from the official and tentative methods of the A.O.A.C. and a toluene distillation method which is quicker and easier in manipulation. The results indicated that the toluene distillation method was not a satisfactory one. A fuller report of this investigation occurs under Section (Chemistry) of this Annual Report.

(c) ADVISORY VISITS, INSPECTIONS, INVESTIGATIONS, ETC.

Lancaster Factory. At the beginning of the year visits were made in connection with the processing of cassava and potatoes. This was followed, after finishing this work, by supervisory visits in relation to repairs, overhauling, and conditioning of machinery prior to the commencement of cassava processing on October 11th.

Visits to Lancaster were also made concerning the pottery investigation work underway. These included consultations with the Ceramist in connection with pottery development, and with matters concerning the erection of two wooden sheds from Seawell, alongside the factory into which the pottery pilot plant was moved.

Cotton Spinning Plant. Visits were made in connection with readjustment and expansion.

Barbados Distilleries. Advisory visits were made in connection with rum manufacture.

Sugars and Syrups. Factory visits connected with the manufacture of fancy molasses and sugar manufacture were made.

Advice and technical assistance was given at certain factories in connection with water softening and related problems.

Miscellaneous. Three visits were made to Colleton, St. John, in connection with the death of a workman in a well there.

An investigation into the quality and price of natural gas was made.

SECTION VI

ENTOMOLOGY

BY

R. W. E. TUCKER.

Entomologist

During the year ending 31st March, 1950, the Entomologist was away on long leave from April 30th to November 10th, 1949.

Increased work was carried out on parasite introduction and breeding of parasites in the laboratory.

A much greater increase took place in the breeding and liberation of the parasite *Lixophaga* which attacks the larval stages of *Diatraea saccharalis* in sugar cane. Altogether 9,000 *Lixophaga* flies were bred and 6,750 were liberated in plant cane fields up to March 31st, 1950. This parasite has been introduced and bred up in Barbados on previous occasions but failed to establish itself. During the period covered by this report, increased efforts were made in the hope that by more continuous liberations, favourable climatic conditions might occur which would give the parasite a start and enable a local strain to become established.

Small Moth Borer (*Diatraea saccharalis*)

Normal breeding of the parasite *Trichogramma* which destroys the eggs of *Diatraea saccharalis*, the small moth borer, was maintained as usual and 347,800,000 egg parasites were bred up, and 304,325,000 made available to planters for their young plant canes. The number of planters calling for their quota of parasites was good.

The annual factory yard bored joint cane counts on moth borer (*Diatraea saccharalis*) infestation was maintained. Again a low average figure of 11.6 per cent of moth borer cane joints damaged was recorded. From 58 samples taken at random in factory yards 57 were of the variety B.37161 and the other was of B.34104.

A paper on this work including a graph covering 20 years' results obtained on a sound and stable basis was prepared and has been accepted for publication by the International Society of Sugar Cane Technologists at the seventh Congress, Brisbane, Queensland in 1950.

Cane Varieties and *D. saccharalis*

Records of the relationship between rind hardness of old and new varieties of sugar cane and damage by *D. saccharalis* together with records of *D. saccharalis* egg deposition and parasitism on various varieties of cane and resultant damage to the cane were maintained at Codrington and elsewhere in co-operation with the Sugar Cane Breeding Station.

Root Borer of Sugar Cane (*Diaprepes abbreviatus*)

As was mentioned in the last Annual Report the root borer *Diaprepes abbreviatus* is on the increase and signs of serious damage to ratoons and even to plant canes were seen in certain areas. Field trials with the insecticide

Gammexane were laid out. So far three (3) of these experimental trials have been reaped; but no significant results were obtained. It is felt that the areas treated with Gammexane were too limited in size or that the method of application and of timing etc. were not fully known. The Department is taking all necessary steps to acquire the information. in view of the fact that only one correctly timed treatment per year appears to be practicable.

Meanwhile a circular has been prepared and posted to all managers, asking that they co-operate with the Department, and resort to the old method of hand-collecting the adult beetles as a temporary measure.

Brown Hardback (*Clemora Smithi*)

This pest appears to be on the decrease, judging by the number of adult beetles which fly into lights or can otherwise be collected or found damaging foliage of garden trees, bushes, etc. This is considered to be due to predators such as the introduced firefly *Pyrophorus luminosus*, to the toad *Bufo marinus*, and to more intensive soil cultivation. The latter factor has also slowed down the re-appearance in much greater strength than recorded above of the root borer, *Diaprepes abbreviatus*: the latter pest gains greater protection by burrowing into the cane stools, which the brown hardback does not and is therefore more susceptible to control by ploughing.

For these reasons, brown hardback beetles and grubs are much less in evidence than they were fifteen or more years ago.

Cane Stem Borer (*Metamasius*)

This pest does not appear to be as numerous as in previous years. This may be due to extensive planting of the cane variety B.37161 which has a low susceptibility to *Metamasius* attack.

Food Crops

The situation regarding pests affecting provision crops remains the same as in the last Annual Report.

Garden Crops (Cabbage and Cauliflower)

Two species of parasites *Apanteles glomeratus* L., and *Pteromalus puparum* for the control of the Cabbage and Cauliflower pests *Pieris monuste* were obtained during the year under review from the Commonwealth Bureau of Biological Control. The former parasite assists in the control of *Pieris monuste* in the larval stage, while the latter should help control the pupal stage.

The consignments of *Apanteles* arrived in the form of cocoons which numbered 1,995, and from these 1,227 *Apanteles* parasites emerged. Unfortunately during this period the infestation of cabbages, cauliflower, etc., by *Pieris monuste* larvae was at a low ebb locally so that only a limited number of these parasites could be liberated. The remainder were retained for laboratory rearing, which so far has not proved successful.

In one area where liberations were made on cabbages infested with larvae, recoveries of *Apanteles* were made and it is probable that this type of parasite is more likely to adapt itself to field conditions than to the laboratory breeding cages. Further importations of this larval parasite are expected. Only one small consignment of the pupal parasite *Pteromalus puparum* was received. It consisted of seven (7) parasitised puparia, from which twenty-eight (28) *Pteromalus* parasites emerged. All of these were kept for laboratory breeding.

With this pupal parasite, laboratory rearing proved quite satisfactory and 88,000 *Pteromalus* parasites were bred up and 60,000 liberated in suitable areas up to March 31st, 1950. In this case unfortunately, no field recoveries have been made despite the large numbers liberated.

Coconut Scale Control.

The predator—*Azya trinitatis* introduced for the control of the coconut scale *Aspidiotus destructor* was found in two new areas on the Leeward coast and has undoubtedly established itself. Some of the adult beetles were collected and transferred to other areas.

White fly Control

Two consignments of *Coccinellids* for the control of "white fly" on coconut and other palms were received from Trinidad during the latter part of the year under review and were liberated in a suitable area. There has been no time to judge whether those liberations have been successful.

Insecticides.

The sale of insecticide by the Department has continued and is successful.

Wood Ant Control.

The Wood Ant Inspector was kept fully occupied by the many demands for inspections to Government and private buildings. Shipments of cases of tea and shoes from the Far East were also inspected by him during the year.

Economic Zoology.

Zinc phosphide baits continued to be used for the control of rats in cane-fields, warehouses, etc. The work of preparing and distributing these baits is carried out by the Agricultural Society. The Medical Department co-operates in respect of town infestations. Large numbers of slugs (*Veronicella occidentales*) causing economic damage in plantation food crops and in household gardens etc., were dealt with as usual by Metaldehyde baits.

SECTION VII.

PLANT DISEASES AND COTTON

BY

D. R. D. WILES

Plant Diseases Inspector.

Mosaic Disease Of Sugar Cane.

Two hundred and twenty-one (221) returns were received in accordance with the Mosaic Disease (Eradication) Act, 1943 (1943-22), and no infected holes were reported. The areas in the Island from which infected holes had been reported in previous years were found to have been planted in the highly resistant variety B.37161, and, this, no doubt, has accounted for the absence of the disease.

Cotton.

The Okra and Cotton Close Seasons extended from the 1st April to 30th June, 1949. Seed was distributed to plant 590 acres of which only 386 acres came to maturity. This was made up as follows :—plantations 24½, and peasants 361½ acres, which yielded 129, 472 lb. of seed cotton from which 34,776 lb. of lint was obtained.

	Plantations	Peasants
Seed Cotton	21,524 lb.	107,948 lb.
Lint	5,757 lb.	29,019 lb.
Ginning percentage	26.7%	26.9%

A supply of Sulphate of Ammonia was made available to the peasants through the co-operation of the Barbados Co-op. Cotton Factory Ltd. Those peasants who availed themselves of this service, materially benefited. Paris Green was also made available to peasants under similar conditions.

Average yield was low owing to poor cultural methods practised by many of the small holders.

Cotton Selection.

The variety trials, A & B, were again carried out at Codrington and the following varieties were used to plant Trial A, viz :—B.4212, B.4310, B.4401, B.4404, B.4411, B.4413, B.4702, B.4705, B.4707 and using B.1 as standard. Trial B was planted with the following varieties, viz :—B.1(3), B.4701, B.4704, B.4706, B.4801, B.4802, B.4804, B.4805, B.4807 with B.1 as standard; some of these were retained for another year.

Selection of seed for the Progeny Row Experiment was made from the following varieties :—B.1, B.4212, B.4310, B.4401, B.4404, B.4411 and B.4907 from which yields of over 1,300 lb. seed cotton per acre were obtained. Seven strains have been selected from these for further trial at Codrington.

The average lint length has been maintained at 60 mms. The standard of Barbados Superfine Sea Island Cotton has been maintained and there have been no rejections by the Liverpool graders. Top prices were paid for the Island Crop.

Cotton Pests & Diseases

The attack of the defoliating worm, *Aletia argillacea*, was not as severe as in previous years and was easily controlled by spraying with lead arsenate or by dusting with Paris green and lime. No pink bollworm has been observed during the period under review.

During the year, several "wild cotton" trees were found growing among the Sea Island Cotton fields. An island-wide inspection of cotton plots was immediately carried out and the "wild cotton" plants rogued out.

Plant Pest and Disease (Importation) Act

Thirty-four (34) permits to import planting material were issued under this Act.

Plant Export Certificates

Seventy-four (74) export certificates were issued during the year.

Miscellaneous Inspections of Imported Planting Material

251	packages of bulbs, rose trees, vegetable and flower garden seeds	..	..	..	—examined and passed
5	packages Rose trees	..	..	..	do.
28	Rose trees	..	..	..	do.
5	packages Orchid Plants	..	..	..	do.
21	Orchid Plants	..	..	..	do.
1	package Pine Plants	..	..	..	do.
1	„ Lily Flowers	..	..	..	do.
4	packages Citrus Plants	..	..	..	do.
1	package Buddleia Plants	..	..	..	do.
5	packages Bulbs	..	..	..	do.
2	Bulbs	..	..	..	do.
1	package Gerbera Plants	..	..	..	do.
24	Gerbera Plants	..	..	..	do.
4	packages Holly Flowers	..	..	..	do.
1	Ixora Plant	..	..	..	do.
2	packages Miscellaneous Plants	..	..	..	do.
635	Coconut Plants	..	..	..	do.
2	Tonca Bean Plants	..	..	..	—roots washed
1	Lily Plant	..	..	..	do.
1	Arrowroot Plant	..	..	..	do.
1	Palm	..	..	..	do.
2	Hibiscus Plants	..	..	..	do.
2	Hydrangea Plants	..	..	..	do.
2	Tamarisk Plants	..	..	..	do.
2	Miscellaneous Plants	..	..	..	do.
3	Coconut Plants	..	..	..	—destroyed

In addition to the above, the routine inspection of articles suspected to contain raw cotton from abroad was carried out, as well as the inspection of 14 bales of Cotton Lint imported for the use of the Experimental Cotton Spinning Plant.

SECTION VIII

ANIMAL HUSBANDRY

BY

M. B. PROVERBS,
Veterinary Officer

In the Department

The policy of stocking the Government Stations with good quality livestock has been continued. It was possible to improve on the previous year's supply of stud animals as several young bulls and bucks, progeny of imported pedigree sires, were available from the Central Livestock Station. Some of these young stud animals were also sold at public auction.

A few of the first heifers sired by the imported bulls have calved at the Central Livestock Station. The Friesians have given higher milk yields than their dams. The Guernseys appear to be maintaining their dams' standard.

The progeny of the Wiltshire Horn rams crossed with the local Black Belly ewe appears very promising. An experiment has been started to compare the cross with the local Black Bellied sheep. Statistics of livestock in possession are given in Table I.

TABLE I.

Census of Livestock at Agricultural Stations and Central Livestock Station

Livestock	31st March, 1949	31st March, 1950
Bulls	22	23
Boars	13	11
Buck Goats	15	15
Rams	10	10
Horses	7	3
Cows	45	47
Heifers and calves	46	40
Sows	22	24
Other Pigs	44	17
Doe Goats	9	7
Kids	19	7
Ewes and Lambs	15	12
Mules	5	5
Donkeys	2	2
Cocks	7	7
Hens	64	43
Chickens	57	43
Total	402	316

The tower silo has proved to be a great success. A second, and larger one, has been built during the past year. It is expected that this type of structure will play a very important part in the proposed "Milk Production and Processing Scheme".

The demand for the services of Government stud animals continues to increase and has caused some difficulty as it appears that more bulls are needed than were originally considered necessary. This makes it necessary to construct additional bull pens at the sub-stations. Experiments have been started by the Veterinary Officer with a view to instituting a system of artificial insemination for dairy cattle.

TABLE II
Services to Livestock other than Government Livestock

	1947—48	1948—49	1949—50
Cows	1,638	1,710	1,608
Goats	1,559	1,669	1,857
Sheep	693	855	1,126
Pigs	776	967	1,063

The service fees charged are as follows:—

Bulls (Imported)	\$5.00
Bulls (Grade)	.72
Boars (Imported)	1.20
Boars (Locally bred)	.48
Bucks (Imported)	1.20
Bucks (Local pure bred)	.60
Bucks (Grade)	.18
Rams	.18

It has been found that these fees cover approximately one-third of the cost of upkeep of the stud animals when they are used to the greatest extent commensurate with good health.

A total quantity of 123,907 $\frac{1}{4}$ lb. of milk was produced at the Central Livestock Station. Production was distributed as follows:—

1949 April	12,895
May	11,235 $\frac{3}{4}$
June	10,115 $\frac{1}{4}$
July	8,493 $\frac{3}{4}$
August	8,403 $\frac{1}{2}$
September	7,183 $\frac{1}{2}$
October	6,349 $\frac{1}{2}$
November	6,482 $\frac{3}{4}$
December	10,646 $\frac{3}{4}$
1950 January	13,368 $\frac{1}{4}$
February	12,363 $\frac{1}{4}$
March	16,370
	123,907 $\frac{1}{4}$

As before, care has been taken in disposing of the milk, not to disrupt the business of private dealers.

A large experiment to test certain fodder grasses has been laid down. This should run for several years.

The pumping equipment was installed late in 1949. The over head irrigation equipment presented by Messrs. Major Aluminium Products, Limited, of Vancouver, has proved to be very satisfactory. Fodder production has been increased considerably by irrigation. Some sugar cane has been irrigated also. Irrigation was frequently stopped due to lack of electricity—this situation is expected to improve.

One thousand and thirty four (1,234) eggs were sold for hatching. Use of the incubators was restricted due to fluctuation in the supply of electricity.

Extension Work.

Dairy Farming. The expansion of the dairy industry continues in the country districts. This has been considerably retarded by the fact that the plans for the creamery have not been executed.

Export Market. The demand for sheep, goats and poultry for other West Indian Islands continues and is being met.

SECTION IX

ANIMAL HEALTH

BY

M. B. PROVERBS

Veterinary Officer.

During the year the health of the Livestock population has been maintained at a satisfactory level and there have been no major outbreaks of disease.

A broad survey into the existing animal diseases amongst livestock in the Island continues and attention is being focused on dairy cattle particularly, as they appear the type of livestock requiring the most urgent attention.

Review of Diseases:

(1) Mastitis in Dairy Cows

An initial survey carried out by Dr. Hutson showed a relatively high incidence of mastitis compared with temperate climate standards. Further observations on the type of organisms responsible for the infection have revealed that the organisms do not differ from those responsible for the disease in other countries, though the incidence of penicillin resistant staphylococci appears relatively higher. There is a clear relationship between milking hygiene and the incidence of mastitis. Where the system of milking and dairy hygiene is good the incidence of mastitis is relatively low. The organisms most frequently responsible for mastitis are streptococci and staphylococci. The type of mastitis most frequently observed is the chronic type which is responsible for a chronic induration of the udder and a consequently lowered milk output during the lactation. This chronic form is liable to flare up, when the resistance of the udder is lowered for any reason, and become acute. An attempt to control this chronic form by penicillin therapy at the drying off stage is being made at the Central Livestock Station and the results of this experiment will be published later.

(2) Brucellosis.

This disease in cattle appears to be on the decline and where it has been established by serum agglutination tests to exist, a policy of isolation, treatment and vaccination has been carried out where the animal warranted retention in the herd.

(3) Trichomoniasis (Cattle).

This disease is still present amongst cattle in the Island and is responsible for early abortions. The incidence, so far as can be judged, appears however to be on the decline.

(4) Anaplasmosis.

This disease, suspected of being present on the Island for many years, has been confirmed by microscopic examination of blood smears, and a survey is at present being made of its incidence and importance.

(5) Piroplasmosis (Red Water).

A disease closely allied to anaplasmosis but more easily diagnosed owing to the characteristic change in colour of the urine. This disease is seasonal and is spread by ticks and during the months of tick activity, weekly dressing with Gamatox Paste Dip using three teaspoonsful of the paste to one gallon of water has been found to control ticks effectively, and so limit the incidence of the disease.

(6) Parasitism.

All classes of livestock on the Island suffer from parasitism to a greater or lesser degree and the standard of nutrition especially during the early stages of life determines in many cases whether the animal is destined to survive. Phenothiazine has proved very effective in the treatment and control of most of the internal parasites in combination with grazing management. Work has been commenced on the effectiveness of the cheaper 1% copper sulphate in combination with incotive sulphate for the control of the heavy infestations of *Haemonchus contortus* in sheep.

Animal Legislation

The Animals (Diseases and Importation) Act, 1949, to control the Importation of Animals, Birds, Reptiles and Insects, and to regulate the treatment and disposal of animals which are suffering or are suspected to be suffering from any disease, and for other matters related thereto or connected therewith was enacted by the Governor, Council and Assembly of the Island and gained assent on 22nd June, 1949. This Act was based on the Jamaican legislation in an effort to ensure greater uniformity in animal legislation within the Caribbean Territories as recommended by the B.W.I. Veterinary Conference, 1947.

TABLE I

Animals Exported — Veterinary Inspection prior to Export

Horses	Mules	Asses	Cattle	Swine	Goats	Dogs	Cats	Rabbits	Sheep	Total
57*	5	1	2	—	26	54	6	12	21	184

TABLE II

Animals Imported — Veterinary Inspection on Arrival

Horses	Mules	Asses	Cattle	Swine	Dogs	Cats	Total
102*	32	60	24	7	39	4	268

*Includes intercolonial movement of racehorses.

SECTION X

FISHERIES

BY

D. W. WILES,
Fishery Officer

During the year, the Fisheries Division has extended its activities to include many phases of work hitherto planned, but which until now had not been put into operation. The activities of this Division may now be grouped as follows:—

A. Administrative

1. Fishing Boat Loan Scheme.
2. Establishment of Fishery Experimental Station.
3. Hauling up of Boats by Tractor at Bathsheba.
4. Registration of Fishing Fleet.
5. Beach Rights.
6. Marketing.
7. General.

B. Investigational

Operation of Fishery Experimental Boat.

A. Administrative

1. Fishing Boat Loan Scheme

During the period under review, the Legislature voted a further amount of \$17,400.00 for the continuation of the Loan Scheme. One hundred and forty-nine loans were approved by the Fisheries Advisory Committee during the year involving a sum of \$13,609.97 : of this amount, \$9,996.97 was taken up by the end of the financial year.

The sum of \$101,640.00 has now been made available since the inception of this scheme for the rehabilitation of the fishing industry. Of this amount, \$91,400.00 has been sanctioned for loans by the Fisheries Committee and \$83,213.16 has been taken up by applicants. The remainder is made up chiefly of discounts on bills and the unspent balance of applications not fully used plus an unspent balance of \$1,362.42 lapsed from various Resolutions which has been repaid to the Colonial Treasury.

Repayments for the year totalled \$9,114.06 and interest collected was \$85.23. These sums bring the total sum repaid to \$43,856.10 with a total of \$507.79 of interest to date.

2. Establishment of Fishery Experiment Station

The establishment of a Fishery Experimental Station was included in the programme for fishery development. Arrangements had been made the previous year to purchase the buildings at the Reef, St. Michael, recently owned and occupied by Messrs. Cable & Wireless, Ltd. These buildings were taken over by the Department during March of 1949, and repairs to buildings and enclosures

carried out. The office of the Fishery Officer was removed from Queen's Park to the Reef in July and work on the grounds was carried out in order that large nets might be spread for drying and mending. Considerable progress has been made with the grounds and the area is almost entirely covered with a thick mat of devil's grass; shade trees and hedges have been planted and should, in a short time, be very useful to the Station. After nine months of occupation, it is safe to say that these premises are most suitable from a fishery standpoint, being in near proximity to the sea where movements of boats and the changes of the sea can be observed. The buildings also offer adequate accommodation for storage of gear used in fishery research.

3. Hauling up Boats by Tractor at Bathsheba

On 28th October, 1949, a tractor with a winch attachment was installed at Tent Bay, Bathsheba; previously, fishermen were forced to haul in their boats by hand every evening on returning from fishing but, with the installation of the tractor, fishermen can get their boats hauled for a charge of 12c. per haul. From 28th October, 1949, to 31st March, 1950, the tractor has made 1,079 hauls for boat owners.

4. Registration of Fishing Fleet

Registration of the fishing fleet as provided under the Fishing Industry Control Act, 1947, was continued during the year. The following schedule, shows the number of boats of all types engaged in the fishing industry for the year 1949-1950:—

Parish	Boats over 20'	Boats under 20'	Pot & Sea egg	Canoes	Total
St. Michael	120	38	52	7	217
Christ Church	64	35	51	—	150
St. Philip	58	23	53	—	134
St. John	14	24	1	—	39
St. Joseph	8	33	—	—	41
St. Lucy	38	13	29	—	80
St. Peter	34	11	57	—	102
St. James	66	28	95	—	189
	402	205	338	7	952

5. Beach Rights

The effort to provide facilities for the hauling up of boats, sale of fish and access to the sea, at beaches around the Island, is continuing and since the erection of beach shelters at Martin's Bay, Consett's Bay, Reid's Bay and Skeete's Bay, land has been purchased and reserved in the interest of the fishing industry at Sherman's, St. Peter. Land is also being purchased through the Compulsory Powers Land Acquisition Act at Payne's Bay, St. James; this matter is still under negotiations; it is expected to erect a market shed at this spot.

6. Marketing

The market originally planned for Oistins was completed during the year. This market will be under operation soon.

It has become necessary to revise the plans for the erection of the fish market at Speightstown owing to the reconstruction of the Speightstown bridge which has encroached on parts of land previously allotted for the fish market. This matter is still receiving attention.

With the establishment of the market sheds, it has been easier to compile statistics of the Island's fisheries. Returns from the Bridgetown Fish Market show an amount of 234,218lb. having been marketed through that centre during official hours—7.00 a.m.—6.00 p.m. This shows an increase of 18,598lb. over last year's figures for the same period. Returns for the four rural market sheds show a total of 231,347lb. of fish. These figures give an estimated value of the Island's fishery of \$1,059,350.00.

The sea egg season was satisfactory. Turtles were also plentiful, but the loss of the sale of shell to England has had its reflections; possibilities of marketing shell in U.S.A. are being examined.

7. General

(a) *Meetings of Fisheries Advisory Committee:*

During the year, there were five meetings of the Fisheries Advisory Committee. Various matters affecting the welfare of the fishing industry were discussed; chief among these were:—

- (i) Loans to fishermen.
- (ii) Illegal dynamiting of fish.
- (iii) Removal of customs duty on fishing gear and diesel oil and petrol used in fishing boats.
- (iv) Marketing.
- (v) Insurance of fishermen and boats.
- (vi) Price Control of fish.
- (vii) Experimental Boat.
- (viii) Report of Secretary of State's Adviser on Colonial Fisheries

(b) *Customs Duty:*

The following articles used in the fishing industry are now admitted free of duty:—

Marine engines, hooks, lines (cotton and hemp), seine twine (hemp and cotton), nets (geared and ungeared), corks and leads.

It has also been agreed that canvas for fishing boats may be purchased ex-bond.

Late in the financial year, a grant of \$2,000.00 was also made available to the Director of Agriculture by the Legislature to meet claims for a refund of duty and road tax on petrol and diesel oil used by powered fishing boats.

(c) *Loss of fishermen and boats:*

During the year, twenty-five fishing boats were lost at sea. Of these, thirteen were covered by insurance amounting to a sum of \$5,560.00. An additional sum of \$156.00 was also paid out by the Insurance Company on salvage claims.

It is regretted that six fishermen lost their lives during the year as a result of these accidents.

(d) *Rescue Work:*

By 31st March, 1950, "Investigator" had towed back to port seven disabled boats which might well have had to drift to some neighbouring Island.

B. Investigational

Operation of Fishery Experimental Boat

A Fishery Research Boat was launched on 21st October, 1949, and named "Investigator". This boat was built by local labour under the supervision of the Fishery Officer. "Investigator" is patterned after a Norwegian design with respect to the hull proper; interior and deck arrangements were re-arranged by the Fishery Officer to suit the several types of fishing gear to be employed with the anticipated experimental fishery research programme.

After the launching, the boat was taken to the outer basin of the harbour for the installation of the engine and equipment. Trials were carried out in early December and "Investigator" went to sea on fishery research on December 12th, 1949.

Since these dates, a Bendix Supersonic Depth Recorder with a range of 0—400 fathoms has been installed with the help of the Government Electrical Inspector. This instrument will be used in the location of banks, and in many other useful phases of research.

General Performance

After three and a half months of sea operation, it is felt that this boat is a very sound craft, as during the months of January and February last, very high winds and extremely rough seas were encountered and were negotiated with reasonable comfort.

Wire Lines for Pelagic Species

During the first three months, experiments have been carried out with wire lines for large pelagic species (kingfish) and on every occasion, weather permitting, this method of capturing the kingfish has been specially examined. It is now definitely established that wire lines are much more efficient than hemp lines for the capture of kingfish.

Plankton Investigation

Much time has been devoted to the collection and study of plankton life, with the object of correlating the presence of plankton life or certain groups of plankton life with the presence of flying fish, as a means of determining or spotting the areas where flying fish are likely to be present in large numbers. Preliminary observations already indicate, with a high degree of accuracy, that flying fish are present in large numbers in areas where certain groups of plankton life are collected on the indicator screen.

Plotting of Currents

The plotting of currents carrying large quantities of both plankton life and flying fish has been an important part of the fishery research work during the year. The position of these currents is reported to the local fishermen and much advantage has been derived from the use of this information.

Gill Nets

The use of the gill net as a method of catching flying fish has already met with such great success that it is felt that it can safely be recommended to fishermen.

SECTION XI

CO-OPERATION

BY

J. M. CAVE,
Co-operative Officer

Introduction

The long awaited Co-operative Societies Act passed through the Legislature in October, 1949. This Act, based on the Model Ordinance submitted by the Secretary of State for the Colonies in 1946, has not yet been proclaimed.

No societies have been registered.

The absence of serious exploitation in the many fields that co-operation normally plays its part in the colonies, has made the need for co-operation less obvious to the community. The special conditions involving the density of the population, the absence of any co-operative tradition and the non-existence of any compact "village" communities, are factors responsible for the slow rate of co-operative development.

The legal limitation of interest on loans to six per cent. to which the population has been accustomed for a long time has prevented exploitation by a money lending class. The need for short term agricultural credit for tenant farmers does require consideration and the vital lesson of thrift can go hand in hand with any credit societies which may be formed.

Consumers co-operation is likely to develop in the direction of farmers' and fishermen's requisite societies. Much has already been done by groups of farmers in obtaining their supplies of fertilizers, insecticides and concentrated stock feeds.

Arrangements for the local marketing of vegetables and fish require improving, but it is feared that the difficulties which beset co-operative marketing in general and the marketing of perishable produce in particular may cause successful development on these lines to be relegated to the distant future.

I. General Progress

There were in existence, five ventures with co-operative organizations during the year. In addition, there were thirty-three groups of small farmers operating for the provision of their fertilizer requirements only. These were very loosely organized and cannot be considered as potential co-operative societies at present.

The following types were represented :—

One (1) Credit Union, of limited liability, providing credit for productive and provident purposes and made up of urban wage and salary earners.

One (1) Consumer Shop
or Buying Club organised by urban wage and salary-earners.

Two (2) Farmers' Re-
quirement
societies, of limited liability, carrying on a wide range of
business for their members.

One (1) Women's society. This is an offshoot of one of the above Farmers' societies; it is in the early stages of formation.

(Thirty-three (33) Farmers' fertilizer groups. Not truly co-operative).

The section of the Department of Science and Agriculture which deals with co-operative organisations, has up to the present consisted of one Co-operative Officer only, who has been fully occupied with the work of his section. Clerical assistance is provided departmentally and the extension staff, consisting of one Senior Agricultural Instructor and sixteen Peasant Agricultural Instructors, are available to assist in minor co-operative projects.

II. Credit

As mentioned in paragraph 8 there is one Credit Union. This is the Shamrock Credit Union which started in 1947 under the sponsorship of the Roman Catholic Church. Its members are almost all urban wage and salary earners and credit is granted for productive and provident purposes. The liability is limited.

There are fifty members and forty-five have so far subscribed 115 fully paid up shares of \$5.00 each. Further capital is being accumulated all the time.

III. Thrift Societies

There are no purely thrift societies at present.

IV. Central Finance

None.

V. Consumers Societies

There is one small Buying Club operating in a rented room on two afternoons a week. Fruit, rice, sugar and a few other commodities are retailed to the members. This business started as a branch of the Shamrock Credit Union and has since been organized separately, although most of its members are also members of the Credit Union.

VI. Marketing and Processing Societies

None. One Farmers society does provide for the marketing of its members' cane crop, but this is only a minor part of its activities.

VII. Craftsmen's Societies

None.

VIII. Women's Societies

The St. Silas Ladies Auxiliary started as a thrift club under the aegis of the St. Silas Men's Co-operative which is a farmers requisite society. Sixty-one dollars and sixty-eight cents has been subscribed by the 15 members and has now been converted into shares. This society plans to go in for co-operative poultry keeping and its members are now studying the subject.

IX. Other Societies

The St. Silas Men's Co-operative has been in existence for about five years. It started as a pig keeping project and soon had to organize to secure regular supplies of concentrated stock feeds. Its members are all small farmers and they have also obtained their fertilizer requirements through

their society. Recently, they have taken their pig project a stage further and set up their own butchery.

There are fifty-three members, but the share capital only amounts to \$182.00. Steps are being taken by the society to increase this more rapidly. The members have successfully got over many individual difficulties and have marketed their cane co-operatively.

The Christ Church Peasants' Co-operative Society started as a fertilizer group in 1948, but has since developed. The society still only provides its members with fertilizer requirements, but it is building up capital and the members are studying co-operative methods with a view to increasing the scope of their activities.

The membership is thirty-three and the share capital is now \$232.65. The total volume of business done during the year was \$1,321.29.

Peasants' fertilizer groups were formed in 1947 to enable small farmers to obtain supplies, as fertilizers were in short supply. The groups also provided for fair distribution. No share capital has been built up, and the service performed is similar to the "Truck Load" societies which were the beginnings of agricultural co-operation in Wales.

During the year, thirty-three groups of peasants, involving a membership of six hundred and six, handled some 127 tons of fertilizer with an approximate value of \$12,390.00

X. Education and Propaganda

The Co-operative Officer spoke to five big meetings of peasants during the year and explained co-operation, its meaning and application. He also attended thirteen Committee meetings of co-operative groups and thirty-one of fertilizer groups.

Training of staff. The Co-operative Officer gave special training in co-operative work to two selected Peasant Agricultural Instructors. These two officers attended twenty meetings of co-operative groups. All the Peasant Agricultural Instructors were given lectures on co-operation and co-operative methods by the Co-operative Officer during the year.

XI. Registration and Liquidation

There being no legislation, there were no registrations or liquidations during the year.

SECTION XII

EXPERIMENTAL COTTON SPINNING PLANT

BY

N. A. PHILLIPS,
Manager

Building.

Only minor repairs to the roof were necessary.

Machinery.

The existing machines required no major repairs and have worked satisfactorily. No additional machinery has been installed.

Staff.

Two female members of the same section of the original staff have resigned. It will be sometime before those who are selected to fill the vacancies can possibly acquire the dexterity that will enable them to operate the machines without active assistance.

General.

During the previous year, it had not been possible, due to unforeseen circumstances, to secure cotton lint from Carriacou so that in order to keep the plant in operation and thus avoid rusting of the machines it had been necessary to operate on half production. The anxiously awaited cotton lint arrived during June/July of the year under review and the plant was immediately put on full production. Frequent periodic failing of the electric power supply and flooding due to heavy rains resulted in loss of production.

In November agreement was reached to dispose of the plant's entire output of yarn for knitting to the West Indian Knitting Mills.

PART IV FINANCIAL STATEMENT

Expenditure and Revenue for the Financial Year 1949—50

EXPENDITURE

Personal Emoluments	\$ 97,480.64
Unestablished Staff	3,360.28
Travelling Allowances	17,255.19
Exhibition Expenses	719.05
Expenses in Control of Cotton Diseases (Salaries of Sub-Inspectors)	1,152.00
Unforeseen Contingencies	82.08
Stationery	954.95
Library	468.63
Destruction of Rats and Beetles	1,044.00
Insurance of Livestock	489.96
Experiment Stations and Botanic Station	40,398.74
Chemical Laboratory	4,869.25
Entomology	11,641.89
Science Teaching at Harrison College	12,665.64
Analyses of Commercial Sugars	2,055.60
Upkeep of Government Lands	354.84
Fisheries	6,155.00
Purchase of Platform Scales	1,315.00
	\$202,462.74

REVENUE

Sale of Ornamental and useful Plants	\$ 888.69
Sale of Produce from Codrington Experiment Station	9,653.60
Fees for Analyses of Sugars and Molasses	7,583.28
Fees for Analyses of Miscellaneous Samples &c.	211.68
Sale of Vegetable Seeds, Insecticides, used Wheat &c.	7,392.13
Deposits on Pots	461.76
Fumigation of Bags &c.	9.50
	\$ 26,200.64

PART V

AGRICULTURAL LEGISLATION

Act 39. 22nd June, 1949.

Customs Tariff (Amendment) Act 1949.

This act permits free of customs duty imported machinery and apparatus required for the purpose of irrigating agricultural land.

PART VI.

LIST OF PUBLICATIONS ISSUED BY THE DEPARTMENT OF SCIENCE AND AGRICULTURE AND B.W.I. CENTRAL SUGAR CANE BREEDING STATION FROM 1925 TO DATE

Department of Science and Agriculture.

Reports:

- Report on the Sugar Cane Experiments for the Season between 1923-25, by
J. P. D'Albuquerque, M.A., F.I.C., F.C.S.
Report on the Sugar Cane Experiments for the Season between 1924-26, by
J. P. D'Albuquerque, M.A., F.I.C., F.C.S.
Report on the Department of Agriculture, Barbados, 1925-26.
Annual Report of the Department of Agriculture, 1926-27.
Report of the Department of Agriculture, Barbados, 1927-28.
Annual Report of the Department of Science and Agriculture, 1928-29.
Report of the Department of Science and Agriculture, Barbados, 1929-30.
Report of the Department of Science and Agriculture, Barbados, 1930-31.

Agricultural Journals:

- Vol. 1 No. 1,
Jan. 1932
(out of print) An Investigation into the Evolution of Sugar Cane Varieties by Breed-
ing in Barbados, 1887-1925, with a discussion on the application
of the Findings to the present day Scheme of Work, by A. E. S.
McIntosh, B.Sc., Ph.D.
A Survey of the Position of *Phytalus smithi*, Arrow, and its Natural
Enemies in Barbados, by R. W. E. Tucker, M.A., B.Ed.
The Scientific Control of Pan Boiling, by S. J. Saint, M.Sc., Ph.D.
The Status of *Trichogramma* as a control of *D. saccharalis* in Barbados,
by R. W. E. Tucker, M.A., B.Ed.
The Inversion of Sucrose in Syrup Manufacture, by C. A. Coppin, B.A.Sc.
Some Aspects of the Flora of Barbados, by F. Hardy, M.A., F.G.S.
Memorandum on the Cotton Situation in Barbados.
- Vol. 1 No. 2,
April 1932. Report on the Work of the Department of Science and Agriculture for
the Year Ending June 30, 1932.
Some Aspects of the Flora of Barbados (Cont'd), by F. Hardy, M.A.,
F.G.S.
- Vol. 1 No. 3,
July 1932 Report of the Geneticist for 1931-32.
Some Aspects of the Flora of Barbados, by F. Hardy, M.A., F.G.S.
- Vol. 1 No. 4,
Oct. 1932 A Discussion of the Results of Manurial Trials carried out on Sugar
Cane in Barbados, 1928-32.
Some Aspects of the Flora of Barbados, by F. Hardy, M.A., F.G.S.
- Vol. 2 Nos.
1 & 2,
April 1933 Report on the Work of the Department of Science and Agriculture for
the Year Ending June 30, 1933.
Some Aspects of the Flora of Barbados (Concluded) by F. Hardy, M.A.,
F.G.S.

- Vol. 2 No. 3,
July 1933 Report of the Geneticist for the Year 1932-33.
- Vol. 2 No. 4,
Oct. 1933 Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D.
Rate of Egg Deposition of *D. saccharalis* and Extent of Larval Mortality in Cane-fields and their relation to Control of *Diatraea* by *T. minutum*, by R. W. E. Tucker, M.A., B.Ed.
Varietal Factors in Cane which may influence extent of Oviposition by *D. saccharalis* and a possible method for Determining Varietal Susceptibility to Borer attack, by R. W. E. Tucker, M.A., B.Ed.
- Vol. 3 No. 1,
Jan. 1934 Sugar Cane Growth Measurements in Barbados, by A. E. S. McIntosh, B.Sc., Ph.D.
A Contribution towards the Solution of the Problem of Control of the real mortality of *D. saccharalis* due to egg parasites, egg predators, natural larval mortality, larval parasitism and other factors, by R. W. E. Tucker, M.A., B.Ed.
- Vol. 3 No. 2,
April 1934 Report on the Work of the Department of Science and Agriculture for the Year Ending March 31st 1934.
- Vol. 3 No. 3,
July 1934 The Coral Limestone Soils of Barbados, by S. J. Saint, M.Sc., Ph.D.
- Vol. 3 No. 4,
Oct. 1934 Report of the Geneticist for the Year 1933-34.
A further Contribution to the Analysis of Field Data on *D. saccharalis* in Barbados, by R. W. E. Tucker, M.A., B.Ed.
- Vol. 4 No. 1,
Jan. 1935
(out of print) Manurial Trials with Sugar Cane.
The Control of *D. saccharalis* in Sugar Cane in Barbados by frequent liberation of mass-reared *Trichogramma*, by R. W. E. Tucker, M.A., B.Ed.
- Vol. 4 No. 2,
April 1935 Report on the Work of the Department of Science and Agriculture for the Year ending March 31st 1935.
- Vol. 4 No. 3,
July 1935 Report of the Geneticist for the Year 1934-35.
- Vol. 4 No. 4,
Oct. 1935 Manurial Trials with Sugar Cane.
Sugar Cane. A Summary of Plantation Variety Yield Returns for Season 1933-35, by A. E. S. McIntosh, B.Sc., Ph.D.
Juice Analyses in Relation to the Fertilizer Requirements of Barbados Soils, by S. J. Saint, M.Sc., Ph.D.
- Vol. 5 No. 1,
Jan. 1936
(out of print) Parasites Introduced into Barbados for Control of Insect Pests, by R. W. E. Tucker, M.A., B.Ed.
Investigations into the Use of the Zeiss Hand Refractometer, by A. E. S. McIntosh, B.Sc., Ph.D., and G. C. Stevenson, B.A.
- Vol. 5 No. 2,
April 1936 Report on the Work of the Department of Science and Agriculture for the Year Ending March 31st, 1936.
- Vol. 5 No. 3,
July 1936 The Yield of Sugar Cane in Barbados in 1936.
Report of the Botanist for the Year 1935-36.
- Vol. 5 No. 4,
Oct. 1936
(out of print) A Preliminary Investigation into Cane Varieties and Infestation by *D. saccharalis*, by R. W. E. Tucker, M.A., B.Ed.
- Vol. 6 No. 1,
Jan. 1937
(out of print) Manurial Trials with Sour Grass, by S. J. Saint, M.Sc., Ph.D.
Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D.
Sugar Cane Spacing Experiments, by G. C. Stevenson, B.A.
- Vol. 6 No. 2,
April 1937
(out of print) Report on the Work of the Department of Science and Agriculture for the Year Ending March 31st, 1937.

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| Vol. 6 No. 3,
July 1937 | The Yield of Sugar Cane in Barbados, 1937.
Report of the Botanist for the Year 1936-37. |
| Vol. 6 No. 4,
Oct. 1937
(out of print) | The Control of Scarabee in Barbados, by R. W. E. Tucker, M.A. B.Ed.
Larval Dispersion of <i>D. saccharalis</i> , by R. W. E. Tucker, M.A., B.Ed. |
| Vol. 7 No. 1,
Jan. 1938 | Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D.
An Account of an Experiment to Determine the Efficiency of two Weed-killing Sprays.
Experiments with the Dwarf Banana.
String Bean Variety Trial, Codrington, 1937.
Experiments in the Use of Hormomone A to Stimulate Rooting and Establishment in Cuttings of Ornamental Plants. |
| Vol. 7 No. 2,
April 1938
(out of print) | Report on the Work of the Department of Science and Agriculture for the Year Ending March 31st 1938. |
| Vol. 7 No. 3,
July 1938 | The Yield of Sugar Cane in Barbados in 1938.
Report on Sugar Cane Breeding and Seedling Testing for the Year 1937-38, by A. E. S. McIntosh, B.Sc., Ph.D. |
| Vol. 7 No. 4,
Oct. 1938
(out of print) | Experiments in the Growing of Tomatoes and shipment to Canada.
Co-operative Sugar Cane Spacing Experiments.
Sweet Potato Storage Experiments. |
| Vol. 8 No. 1,
Jan. 1939 | Manurial Trial with Sea Island Cotton, by S. J. Saint, M.Sc., Ph.D.
Cotton Growing and Cotton Pests Control, by R. W. E. Tucker, M.A. B.Ed.
The Control of <i>D. abbreviatus</i> , L. and <i>L. (Phytalus) smithi</i> , Arrow, in Barbados, surveyed over a period of eleven years, by R. W. E. Tucker, M.A., B.Ed. |
| Vol. 8 No. 2,
April 1939 | Report on the Work of the Department of Science and Agriculture for the Year Ending 31st March, 1939. |
| Vol. 8 No. 3,
July 1939 | The Yield of Sugar Cane in Barbados in 1939.
Report on Sugar Cane Breeding and Seedling Testing for the Year 1938-39, by A. E. S. McIntosh, B.Sc., Ph.D. |
| Vol. 8 No. 4,
Oct. 1939 | Introduction, by R. W. E. Tucker, M.A., B.Ed., of Dry Area Race of <i>M. minense</i> into Barbados.
The Termites of Barbados, by R. W. E. Tucker, M.A., B.Ed.
<i>Bufo Marinus</i> , L. in Barbados, by R. W. E. Tucker, M.A., B.Ed. |
| Vol. 9 No. 1,
Jan. 1940 | Manurial Trials with Sugar Cane, by C. B. Johnston, B.Sc. |
| Annual Report of the Department of Science and Agriculture for the Year 1940-41. | |
| Annual Report of the Department of Science and Agriculture for the Year 1941-42. (Out of print). | |
| Annual Report of the Department of Science and Agriculture for the Year 1942-43. (Out of print). | |
| Annual Report of the Department of Science and Agriculture for the Year Ending 31st March, 1944. | |
| Annual Report of the Department of Science and Agriculture for the Year 1944-45. | |
| Annual Report of the Department of Science and Agriculture for the Year 1945-46. | |
| Annual Report of the Department of Science and Agriculture for the Year 1946-47. | |
| Annual Report of the Department of Science and Agriculture for the Year 1947-48. (Out of print). | |
| Annual Report of the Department of Science and Agriculture for the Year 1948-49. | |

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| No. 1, Jan.
1941 | Garden Pests of Local Importance. |
| No. 2, Jan.
1941 | Manuring of Crops. |

No. 3	The Identification and Treatment of the Common Diseases of the Chief Vegetable Crops.
No. 4	Compost Making.
No. 5 (out of print)	Rabbit Keeping in Barbados.
No. 6, Aug. 1942	The Care and Maintenance of the Milch Goat in Barbados.
No. 7	The Growing of Food Crops.
No. 8 (out of print)	Hints to Cotton Growers.
No. 9, Oct. 1942	The Selection and Storage of Seed Corn in Barbados.
No. 10, Oct. 1942	(1) Possible Means for an Efficient Use of a Large Sweet Potato Crop. (2) War-time Rations for Livestock. (3) The Storage of Sweet Potatoes in Clamps.
No. 11, Nov. 1942	Ways of Cooking Sweet Potatoes.
No. 12 (out of print)	Recipes for the Use of Local Foodstuffs.
No. 13	Recipes for the Use of Cassava Flour.
No. 14, Nov. 1945	The Use of D.D.T. in Barbados.
No. 15, Oct. 1947	Contour Farming.
No. 16, Dec. 1948	Contour Cultivation in Barbados.
No. 17, July 1949	Hints on the Growing of Citrus Trees.
No. 18, May 1950	Soil Conditions and Sugar Cane Growth in Barbados.

Bulletins: (New Series)

No. 1, Jan. 1944	Inventory of the Barbados Rocks and their Possible Utilization, by Alfred Senn, Ph.D.
No. 2, Aug. 1944 (out of print)	The Culture of Garden Vegetables in Barbados, by D. M. Hanschell, B.Sc.
No. 3	Notes on West Indian Hurricanes with Special Reference to Barbados, by C. C. Skeete, B.A.
No. 4, May 1945	Manurial Trials with Food Crops, by F. H. B. Blackburn, B.Sc., A.R.I.C.
No. 5, Oct. 1945	The Yield of Sugar Cane in Barbados in 1945, by C. B. Foster.
No. 6, Jan. 1946	Sugar Cane and its Cultivation in Barbados, by C. B. Foster.
No. 7, July 1946	Manurial Trials with Sugar Cane in Barbados, by F. H. B. Blackburn, B.Sc., A.R.I.C.

No. 8, July 1946	The Yield of Sugar Cane in Barbados in 1942, by C. B. Foster.
No. 9	The Yield of Sugar Cane in Barbados in 1946, by C. B. Foster.
No. 10, Aug. 1947	The Yield of Sugar Cane in Barbados in 1947, by C. B. Foster.
No. 11, Oct. 1947	Peasant Agriculture in Barbados, by M. Halcrow, B.Sc., A.I.C.T.A., and J. M. Cave, D.I.C.T.A.
No. 12, July 1948	The Yield of Sugar Cane in Barbados in 1948, by C. B. Foster.
No. 13, July 1949	The Yield of Sugar Cane in Barbados in 1949, by C. B. Foster.
No. 14, Dec. 1949	Manurial Trials with Sugar Cane in Barbados II, by J. B. D. Robinson, B.Sc.

British West Indies Central Sugar Cane Breeding Station.

Reports:

Report on the British West Indies Central Sugar Cane Breeding Station for the Period
Ending September 30th, 1934.
Report for the Year Ending September 30th, 1935.
Third Annual Report Ending September 30th, 1936.
Fourth Annual Report Ending September 30th, 1937.
Fifth Annual Report Ending September 30th, 1938.
Sixth Annual Report Ending September 30th, 1939.
Seventh Annual Report Ending September 30th, 1940.
Eighth Annual Report Ending September 30th, 1941.
Ninth Annual Report Ending September 30th, 1942.
Tenth Annual Report Ending September 30th, 1943.
Eleventh Annual Report Ending September 30th, 1944.
Twelfth Annual Report Ending September 30th, 1945.
Thirteenth Annual Report Ending September 30th, 1946.
Fourteenth Annual Report Ending September 30th, 1947.
Fifteenth Annual Report Ending September 30th, 1948.

Bulletins:

No. 1, Sept. 1933	Report on the Sugar Cane Breeding Problems of Antigua, Trinidad and St. Kitts, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 2, June 1934	Report on the Sugar Cane Variety Problems in St. Lucia derived from a Visit during April, 1934, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 3, Sept. 1934	Report on a Visit to Jamaica, June 1934, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 4, Nov. 1934 (out of print)	Report on a Visit to Grenada, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 5, Feb. 1935 (out of print)	Investigations into the Root Development of the Sugar Cane in Bar- bados. (i) Root Development in several Varieties under one Environ- ment, by G. C. Stevenson, B.A., A.I.C.T.A., Assistant Botanist, and A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 6, June 1935	An Account of the Policy and Methods Employed in the Breeding and Initial Stage of selecting Sugar Cane Seedlings, by A. E. S. McIn- tosh, B.Sc., Ph.D., Geneticist.
No. 7, July 1935	Report on a Second Visit to Antigua, April 1935, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.
No. 8, Aug. 1935	Gumming Disease Investigations in Barbados, by A. E. S. McIntosh, B.Sc., Ph.D., and G. C. Stevenson, B.A.

- 1935 An Account of the Methods Employed in Testing and Selecting Sugar Cane Seedlings for Thick Cane Areas in the British West Indies, by A. E. S. McIntosh, B.Sc., Ph.D.
- No. 9, Nov. 1936 The Yield of Sugar Cane in Barbados in 1936.
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APPENDIX I.

METEOROLOGICAL OBSERVATIONS RECORDED AT THE METEOROLOGICAL STATION, CODRINGTON.

Height Above Sea Level 181 Feet.
Latitude 13° 7' 36" N. Longitude 59° 35' 57" W.

The following are the summaries of the observations recorded for the year 1949. The details are given in Appendix II.

Barometric Pressure. The records refer to observations made at the hours of 9.00 a.m. and 3.00 p.m. only and are expressed in inches of mercury. During the year 1949, the mean pressure corrected for temperature and gravity and reduced to sea level was at 9.00 a.m. 29.979 and at 3.00 p.m. 29.906, the highest pressure recorded being 30.082 on the 15th April and the lowest 29.734 on the 13th of December. For the ten-year period 1939-1948, the average barometric pressure was at 9.00 a.m. 29.983 and at 3.00 p.m. 29.910. The highest pressure recorded at 9.00 a.m. during the ten-year period was 30.131 on the 21st February, 1946, and the lowest pressure recorded at 3.00 p.m. was 29.658 on the 12th November, 1946.

Temperature. The daily mean maximum temperature for the year 1949 was 85.2° F. and the daily mean minimum 72.0° F. The maximum extreme for the year was 89.0° F. registered on the 28th May and the minimum extreme was 60.5° F. registered on the 11th and 15th January. The average monthly mean temperature was 78.2° F. the highest monthly range 23.5° F. and the lowest 17.0° F.; the mean monthly range being 18.9° F. For the ten-year period 1939-1948, the daily mean maximum was 85.4° F. and the daily mean minimum 72.0° F. During the ten-year period the average monthly mean temperature was 78.6° F., the maximum extreme was 95.0° F. on the 21st August, 1943; the minimum extreme 60.5° F. on the 29th February, 1944, and the average monthly range 19.3° F.

Tension of Vapour and Relative Humidity. The mean tension of vapour for the year 1949 was at 8.00 a.m. .737, and at 4.00 p.m. .698. The mean relative humidity was at 8.00 a.m. 72.9 per cent. and at 4.00 p.m. 63.7 per cent.

Wind. The daily (24 hour period) mean velocity of the wind during the year 1949 was 9.2 miles an hour. Records were kept of half-daily or twelve-hour periods from 6.00 a.m. to 6.00 p.m., and 6.00 p.m. to 6.00 a.m. The maximum velocity for any such twelve-hour period was 20.1 miles an hour, recorded between 6.00 a.m. and 6.00 p.m. on the 5th of April and the minimum velocity 1.2 miles an hour recorded between 6.00 p.m. and 6.00 a.m. on the 3rd and 4th of September. The average daily (24 hour period) velocity for the ten years ended 1948 was 9.6 miles an hour.

Rainfall. The rainfall measured at the Government Meteorological Station during the year 1949 amounted to 58.81 inches. Rainfall was recorded on one hundred and seventy-seven days, the greatest fall being 8.00 inches on the 31st of August. For the ten-year period 1939-1948, the average total rainfall was 44.76 inches and the average number of days annually on which rain fell was one hundred and seventy-eight.

Rainfall of the Island. The average total rainfall for the year 1949 from sixty-three stations was 60.89 inches, being 1.19 inches above the average for the hundred years ended December 31st, 1948, which was 59.70 inches. Details are given in Appendix III.

APPE
Meteorologic

MONTH	Mean Pressure Reduced to 32°F Latitude 45° and Mean Sea Level					TEMPERATURE				
	9 a.m.	3 p.m.	Mean	Highest	Lowest	Max. Mean	Min. Mean	Max. Extreme	Min. Extreme	Mean for Month
January ...	29.993	29.914	29.953	30.059	29.799	82.5	67.0	84.0	60.5	74.0
February ...	30.013	29.936	29.974	30.068	29.837	83.8	70.2	85.5	65.0	77.0
March ...	29.985	29.906	29.945	30.046	29.801	85.3	70.3	86.5	66.0	77.0
April ...	30.030	29.950	29.990	30.082	29.885	86.0	71.1	87.5	67.5	78.0
May ...	29.997	29.922	29.959	30.048	29.885	87.1	74.0	89.0	71.0	80.0
June ...	30.004	29.950	29.977	30.072	29.904	86.2	74.3	88.0	71.0	80.0
July ...	30.007	29.948	29.977	30.037	29.885	85.9	74.2	87.5	70.0	80.0
August ...	29.964	29.909	29.936	30.023	29.738	86.8	74.5	88.5	71.0	80.0
September ...	29.962	29.899	29.930	30.039	29.805	86.2	73.0	88.0	70.5	79.0
October ...	29.947	29.878	29.912	30.013	29.835	85.5	72.7	88.5	70.5	79.0
November ...	29.930	29.841	29.885	30.021	29.782	84.1	72.1	86.5	68.5	78.0
December ...	29.912	29.828	29.870	29.975	29.734	82.9	71.3	85.5	66.0	77.0
TOTAL ...	359.744	358.881	359.308	360.483	357.890	1022.3	864.7	1045.0	817.5	943.0
AVERAGE ...	29.979	29.906	29.942	30.040	29.824	85.2	72.0	87.0	68.1	78.0

NDIX II.

al Report for 1949

TEMPERATURE °F				TENSION OF VAPOUR			RELATIVE HUMIDITY			Velocity Miles per Hour	Daily Mean Sunshine (hours)	Rainfall (Inches)	No. of Days on which Rain fell
Month	Range for Month	Dew Point 8 a.m.	Dew Point 4 p.m.	8 a.m.	4 p.m.	Mean	8 a.m.	4 p.m.	Mean				
7	23.5	66.6	64.2	.658	.600	.629	75.9	58.5	67.2	7.3	9.1	.56	10
8	20.5	66.3	65.1	.649	.622	.635	70.5	59.7	65.1	11.1	9.3	1.03	10
9	20.5	66.6	64.0	.657	.604	.630	68.2	55.2	61.7	10.0	8.6	.68	10
10	20.0	67.2	65.7	.670	.636	.653	66.7	56.3	61.5	10.7	9.5	1.18	12
11	18.0	69.7	67.4	.713	.666	.689	66.2	57.6	61.9	12.0	9.6	2.69	12
12	17.0	70.5	69.0	.746	.716	.731	69.9	63.6	66.7	12.3	8.6	4.56	17
1	17.5	71.6	69.5	.779	.726	.752	73.8	62.8	68.3	10.2	8.7	3.09	20
2	17.5	72.3	70.6	.786	.753	.769	72.2	64.9	68.5	9.2	8.2	15.86	15
3	17.5	73.9	71.9	.840	.785	.812	79.4	69.8	74.6	5.5	7.3	11.66	18
4	18.0	73.9	72.7	.837	.806	.821	79.1	75.1	77.1	6.0	6.8	12.66	21
5	18.0	71.5	70.4	.771	.748	.759	76.1	70.7	73.4	7.4	8.4	2.42	16
6	19.5	70.0	69.0	.736	.718	.727	77.4	70.1	73.7	8.2	6.7	2.42	16
7	227.5	840.1	819.5	8.842	8.380	8.607	875.4	764.3	819.7	109.9	100.8	58.81	177
8	18.9	70.0	68.3	.737	.698	.717	72.9	63.7	68.3	9.2	8.4	4.90	15

APPENDIX

Barbados Rainfall from January

NAME OF STATION	Number of Stations	January		February		March		April		May		June
		Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	
DISTRICT "A"—ST. MICHAEL												
Lowlands ...	6	9	.78	10	1.05	11	1.01	10	1.85	11	2.04	14
DISTRICT "B"—CHRIST CHURCH												
Lowlands ...	6	8	1.06	6	.52	10	1.53	7	1.08	8	1.34	13
—ST. GEORGE												
Highlands ...	1	9	1.85	8	1.14	13	2.20	9	2.04	14	2.88	11
Lowlands ...	5	9	.99	10	1.00	12	1.39	14	1.79	11	1.99	14
DISTRICT "C"—ST. PHILIP												
Highlands ...	2	11	1.39	7	.40	10	1.09	11	1.32	12	1.65	13
Lowlands ...	7	8	.99	7	.77	9	.99	11	1.98	10	2.04	14
—ST. JOHN												
Highlands ...	6	12	1.61	9	.96	12	2.04	12	1.71	13	2.12	14
Lowlands ...	1	3	.95	4	.54	5	1.16	7	1.41	8	1.44	13
DISTRICT "D"—ST. THOMAS												
Highlands ...	5	10	2.02	9	1.45	13	2.13	11	1.72	14	2.58	15
Lowlands ...	2	9	1.53	10	1.25	12	1.52	9	1.51	14	2.00	13
—ST. JAMES												
Highlands ...	1	10	1.92	10	1.31	11	1.52	15	1.90	13	2.83	14
Lowlands ...	5	7	.92	8	1.11	9	1.11	7	.87	9	1.57	13
DISTRICT "E"—ST. PETER												
Highlands ...	1	6	1.10	7	1.23	8	.87	8	.93	5	1.76	8
Lowlands ...	4	7	1.50	7	1.06	8	1.13	8	1.26	8	1.48	12
—ST. LUCY												
Lowlands ...	2	2	.38	6	.92	8	1.19	5	.58	4	1.52	12
DISTRICT "F"—ST. JOSEPH												
Highlands ...	4	11	1.28	11	1.29	12	1.85	14	1.93	14	1.99	18
Lowlands ...	1	7	1.27	6	.79	7	.99	8	1.22	8	1.30	11
—ST. ANDREW												
Highlands ...	2	9	1.51	8	1.18	7	1.09	9	1.13	8	1.73	13
Lowlands ...	2	6	.80	8	1.21	8	1.26	7	.94	12	2.39	15
Totals	63	153	23.85	151	19.83	185	26.07	182	27.17	196	37.26	250
AVERAGE		8	1.25	8	1.04	10	1.37	9	1.43	10	1.96	13

in.

y to December, 1949.

ne	July		August		September		October		November		December		TOTAL.	
Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches
4.18	16	2.89	13	14.78	17	9.75	20	12.32	13	2.45	16	2.67	160	55.77
4.45	15	3.86	14	13.61	16	6.35	17	14.28	12	2.43	16	3.07	142	53.58
6.04	17	4.21	13	15.84	21	10.40	22	17.23	14	2.76	16	4.81	167	71.40
5.13	15	3.59	15	15.88	19	7.18	19	16.84	14	2.87	16	3.46	168	62.11
6.25	14	2.79	16	14.34	16	5.84	24	10.98	13	2.75	19	3.37	166	52.18
6.16	13	2.52	13	14.13	15	6.79	16	11.90	11	2.03	14	3.48	141	53.78
6.50	18	3.27	16	14.74	16	8.09	22	13.49	15	3.89	17	3.69	176	62.11
6.39	13	2.61	10	18.96	10	8.08	22	13.80	12	2.88	10	1.96	117	60.18
6.56	18	3.60	15	13.91	20	12.08	23	14.45	18	4.10	18	4.33	184	68.93
6.28	16	3.43	14	14.69	16	9.73	21	12.75	14	2.88	16	3.50	164	61.72
8.58	16	4.38	13	14.09	19	15.72	22	14.83	21	4.89	12	4.08	176	76.65
4.53	14	2.71	11	13.72	16	10.99	18	9.83	13	2.67	12	2.62	137	52.65
5.84	5	1.49	8	10.49	11	13.70	15	12.00	12	4.33	10	3.31	103	57.10
7.06	14	2.89	13	9.06	15	19.05	19	13.10	13	4.11	15	3.85	139	65.55
6.37	7	2.41	10	7.11	13	17.90	16	15.04	11	3.57	10	4.54	104	61.53
7.86	19	2.98	15	14.24	20	11.05	23	12.86	18	4.27	17	3.42	192	65.02
5.49	9	1.68	11	11.88	14	8.73	19	11.23	11	2.45	11	2.26	122	49.34
6.58	13	2.31	13	11.45	15	16.08	21	11.98	13	4.19	14	3.85	143	63.08
6.26	15	2.36	12	12.60	14	13.79	23	13.92	15	4.50	18	4.36	153	64.19
16.51	267	55.98	245	255.52	303	211.40	382	252.83	263	63.82	277	66.63	2,854	1,156.87
6.13	14	2.95	13	13.45	16	11.13	20	13.31	14	2.36	15	3.51	150	60.89

CHECKED BY
R. Y.